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In re Patent Application of:

Tadao TSUCHIMURA, et al.

Application Serial No.: 09/764,302

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Filed: January 19, 2001

Group Art Unit: 2174 Technology Center 2100

Examiner: Nguyen, Le. V.

For: INFORMATION DISPLAY SYSTEM HAVING GRAPHICAL USER INTERFACE
SWITCHINGLY CONTROLLING INFORMATION DISPLAY ON DISPLAY SCREEN (AS
AMENDED)

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**SUBMISSION OF VERIFIED ENGLISH TRANSLATION OF THE
CERTIFIED COPY OF PRIOR FOREIGN
APPLICATION IN ACCORDANCE
WITH THE REQUIREMENTS OF 37 C.F.R. § 1.55**

Commissioner for Patents
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Alexandria, VA 22313-1450

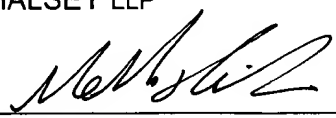
In accordance with the provisions of 37 C.F.R. § 1.55, to perfect the Applicants' foreign priority filing date to overcome the date of a reference, the Applicants submit herewith a Verified English Translation of the certified copy of the following foreign application:

Japanese Patent Application No. 2000-135030 - Filed: May 8, 2000

It is respectfully requested that the applicants be given the benefit of the foreign filing date as evidenced by the certified papers attached hereto, in accordance with the requirements of 35 U.S.C. § 119.

Respectfully submitted,
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VERIFICATION OF TRANSLATION

Japanese Patent Application No. 2000-135030
Filed on May 8, 2000

I, Akira HIRAKAWA, a citizen of Japan and the translator of the document attached, whose address is c/o SHUWA CHIZAI INC., Acropolis 21 Building, 6th Floor, 4-10, Higashi Nihonbashi 3-chome, Chuo-Ku, Tokyo, Japan, state that the following is a true translation of the Japanese Patent Application No. 2000-135030 filed on May 8, 2000 to the best of my knowledge and belief.

Signed at Tokyo, Japan
This 16th day of June, 2004

A handwritten signature in cursive script, reading "Akira Hirakawa".

Akira HIRAKAWA
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SHUWA CHIZAI INC.

**PATENT OFFICE
JAPANESE GOVERNMENT**

This is to certify that the annexed is a true copy of
the following application as filed with this Office.

Date of Application: May 8, 2000

Application Number : 2000-135030

Applicant : FUJITSU LIMITED

September 22, 2000

Kohzo OIKAWA Seal
Commissioner,
Patent Office

Certification No. 2000-3076936



[Name of Document]

Application for Patent

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[Reference Number]

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[Filing Date]

May 8, 2000

[Addressee]

Commissioner of the Patent Office

[International Patent Classification]

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[Title of the Invention]

INFORMATION DISPLAY SYSTEM AND MEDIUM

[Number of Claims]

10

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[List of Documents submitted]

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|------------------------------------|---------------|---------|
| [Name of Document] | Specification | 1 copy |
| [Name of Document] | Drawings | 1 set |
| [Name of Document] | Abstract | 1 copy |
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[Name of Document]

Specification

[Title of the Invention]

INFORMATION DISPLAY SYSTEM AND MEDIUM

[Scope of Claims]

[Claim 1] An information display system comprising:

a display unit including a plurality of display areas formed by dividing a predetermined area;

an operation unit for designating an item of information to be displayed in each of said display areas;

an acquiring unit for acquiring the designated item of information;
and

a control unit having the acquired information displayed in the corresponding display area.

[Claim 2] An information display system according to claim 1, wherein when a first item of information displayed in a first display area is related to a second item of information, and when the second item of information is designated to be displayed, the second item of information is displayed in a second display area while keeping the display of the first item of information in said first display area.

[Claim 3] An information display system comprising:

a display unit for displaying a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information;

a detection unit for detecting an operation of an operation unit with respect to said turn object; and

a control unit for turning said indicator in accordance with the detected operation.

[Claim 4] An information display system comprising:

a communication unit for acquiring information by accessing to a network;

a display unit for displaying the acquired information;

a correspondence storage unit for making an item of identifying information correspond to a specified item of information; and

a control unit for displaying, in a display area, the information acquired from the network via said communication unit,

wherein said display unit includes a display area for displaying the information and a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information, and

said control unit detects an operation of an operation unit with respect to said turn object, turns said indicator in accordance with the detected operation, and displays the information corresponding to the identifying information indicated in a position to which said indicator is turned.

[Claim 5] An information display system comprising:

a display unit for displaying an object displayed on a screen, the object being an operation target; and

a control unit for detecting an indicating operation by an operation unit with respect to said object, and for changing a display mode of displaying said object on said display unit in accordance with the detected indicating operation,

wherein said object displayed in a first display position is moved to and displayed in a second display position by the indicating operation.

[Claim 6] A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

forming a plurality of display areas by dividing a predetermined area;

designating information to be displayed in the display area;

acquiring a designated item of information; and

displaying the acquired information in the display area corresponding thereto.

[Claim 7] A computer-readable storage medium with a recorded program according to claim 6, for further executing a step of, when a first item of information displayed in a first display area is related to a second item of information, and when the second item of information is designated to be displayed, displaying the second item of information in a second display area while keeping the display of the first item of information in said first display area.

[Claim 8] A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

displaying a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information;

detecting an operation with respect to said turn object; and

turning said indicator in accordance with the detected operation.

[Claim 9] A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

acquiring information by accessing to a network;

forming a display area for displaying the information;

displaying a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information;

making the identifying information correspond to a specified item of information;

detecting an operation with respect to said turn object;

turning said indicator in accordance with the detected operation;
and

displaying, in said display area, the information corresponding to the identifying information indicated in a position to which said indicator is turned.

[Claim 10] A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

displaying an object displayed on a screen, the object being an operation target;

detecting an indicating operation with respect to the object; and

changing a display mode of displaying said object in accordance with the detected indicating operation,

wherein said object is moved to and displayed in a second display position when detecting the indicating operation with respect to said object displayed in a first display position.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to an information display system having a graphical user interface.

[0002]

[Prior Art]

With a spread of the Internet over the recent years, a technology of readily browsing the information has been demanded. As a result, an information display system incorporating a program known as a browser was developed. The conventional browser has only one display area, and hence the user switches to a page desired to be displayed by updating the information in that display area by overwriting, or starting another browser and displaying the information thereon, or rewriting contents in the same display area by selecting an index called a tab.

[0003]

Generally, the information browsed on the Internet takes a structure called a web, in which plural pieces of information are linked. This mechanism for connecting the information to the information is known as a "link". In the Internet, the user is able to browse the items of information related to each other by following the links (normally, by clicking the information indicating the link with a pointing device such as a mouse etc).

[0004]

However, the conventional display system displays the information to be browsed in the single display area and is therefore very hard to use in the following applications in some cases.

(1) When the user refers to a link destination (clicks a link) from one item of information (which will hereinafter be called an original page) on the Internet, the information of the link destination is displayed by erasing the original page. Therefore, if the user tries to refer to other item of information linked to the original page, the user must

executes an operation of getting [Back] to the original page each time. Further, in order to avoid the laborious getting back operation, the user must perform an operation of starting the browser again and displaying the original page thereon.

(2) With the conventional single browser, the user is unable to compare two contents. For example, in the case of creating two schemes of homepage and trying to compare them with each other and of trying to compare commercial articles in Net shopping, the user must start the two browsers.

(3) When the user attempts to arrange plural items of information in the same screen dimensions, it takes time and labor to adjust the screen dimensions of the browsers opened separately and arrange them.

(4) When the user tries to get back to a specified page after following the plurality of links, the user must return by executing the [Back] function each time. In this case, the prior art provided a function of displaying a history of having followed the links with characters of tiles of respective pages and designating a return page. The title characters do not, however, enable the user to sufficiently grasp contents of that page. The user is therefore unable to accurately find out the desired page in the history.

(5) With the conventional browser, a page exhibiting a high frequency of accessing by the user is registered by utilizing a bookmark function (this page will hereinafter be referred to as a registered page). The user is, however, unable to browse a plurality of registered pages at one time.

(6) When the user attempts to monitor an image or a picture on the page updated periodically, e.g., at an interval of several minutes,

if the user is tempted to browse other page in a time till the former page is updated, there might be a possibility in which the user fails to see the updating of the image or the picture that should be monitored.

(7) With the conventional browser, the user selects the page to be displayed by inputting an address in an address input field or picking up a desired page from a list of registered pages. Of these, with the selection from the registered pages, the operating procedures are taken such that a hierarchy-structured list is displayed, and the user clicks the page with the mouse. Therefore, the user is required to refer to the hierarchy-structured list in order to select the desired page, which is complicated in terms of operation.

[0005]

On the other hand, an information processing system of nowadays such as a personal computer etc uses a variety of programs such as mailer for reading mail information in addition to the browser described above, depending on a category of the information. The user operates those programs in a graphical user interface (GUI) environment. A display on the screen, which is an operation target and represents a program or information, is called an object.

[0006]

In the GUI environment, a general technology of moving this object is an operation known as a drag involving the use of a pointing device. The drag is to manipulate the pointing device such as the mouse etc in a way of dragging the object on the screen while pointing the object in order to bring the object that the user wishes to move to a position where the user wishes to move the object.

[0007]

In the prior art, if the object displayed on the screen is overlaid by other object and the whole or a part of this object is invisible, the user has hitherto moved the object overlaying the former object by dragging it.

[0008]

This operation method needs a space for operating the pointing device such as the mouse etc. Also, the use is required to perform the operation of moving the object while depressing a mouse button. Hence, there arises a problem inherent in this operation method, wherein the operation is hard to persons advanced in age and children or persons somewhat disable in their hands.

[0009]

While on the other hand, if the user sets the object displayed on the upper side in a non-display state, the problem described above is not caused. If the object overlaying indicates the information necessary for the user, however, a demand is that both of the upper and lower objects should be displayed.

[0010]

[Problems to be solved by the Invention]

It is a primary object of the present invention, which was devised to obviate the problems peculiar to the prior art, to provide an information display system capable of efficiently browsing items of information related by links.

[0011]

It is another object of the present invention to provide an information display system capable of readily comparing plural items of information.

It is a further object of the present invention to provide a graphical user interface for displaying plural items of information by readily switching the information.

[0012]

It is a still further object of the present invention to provide operation procedures of readily obviating, when a plurality of objects are overlapped with each other, this overlap of the objects in the graphical user interface.

[0013]

[Means for solving the Problems]

To accomplish the above objects, the present invention adopts the following means.

Namely, the present invention is such that, in displaying information, a plurality of display areas formed by dividing a predetermined area are provided, an information to be displayed in each display area is designated, the designated information is acquired, and the acquired information is displayed in the corresponding display area.

[0014]

In this case, the information may be acquired by accessing to a network.

Further, histories of items of information displayed may be stored, and the items of information stored as the display histories may be displayed in a predetermined order in the respective display areas.

[0015]

When a first item of information displayed in a first display area is related to a second item of information, and when the second item

of information is designated to be displayed, the second item of information may be displayed in a second display area while keeping the display of the first item of information in the first display area.

[0016]

In this case, the first item of information may be related to the second item of information by use of a specified keyword, and, when the keyword is dragged and dropped to the second display area, the second item of information may be displayed.

[0017]

Based on this configuration, the plural items of information related to one another can be simultaneously displayed on the screen. Further, time and labor for an operation of getting back to the display histories is saved. Moreover, there is provided a function of displaying the plural items of information arranged and comparing them.

[0018]

Identifying information for identifying the display area may be displayed, when the identifying information corresponding to the display area is designated through an operation unit, the display area corresponding to the identifying information may be enlarged, and only the single display area may be displayed.

[0019]

The identifying information may be displayed within the display area identified by the identifying information, when detecting an indicating operation with respect to the identifying information, the display area corresponding to the identifying information may be enlarged.

[0020]

In this case, when detecting an indication operation with respect to the identifying information, the enlarged single display area may be changed into a plurality of display areas.

Further, the present invention may be configured such that the screen includes a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information, an operation with respect to the turn object is detected, the indicator is turned in accordance with the detected operation, and the information corresponding to the identifying information indicated in the position to which the indicator is turned is displayed in the display area.

[0021]

This operation is an operation effected on a pointing device having at least two pieces of buttons, and the indicator may turn counterclockwise by depressing the first button and turn clockwise by depressing the second button.

[0022]

It is preferable that the two buttons are right and left buttons, the first button is the left button, and the second button is the right button.

[0023]

With this contrivance, the information to be displayed can be switched by turning the turn object with a simple operation.

The turn object may have pieces of information arranged along the substantially circumferential shape and each representing the number of divisions by which the display area of the display unit is divided,

when the indicator is turned to the position of indicating the information representing the number of divisions, the display area may be divided by this number of divisions, and plural items of information may be displayed in the divided display areas.

[0024]

The present invention is such that, in displaying information, an object including an indicator for indicating any one piece of identifying information among plural pieces of identifying information is displayed, contents of an indicating operation with respect to the object is detected, and the identifying information indicated by the indicator is changed in accordance with the detected contents of the indicating operation.

[0025]

The present invention is such that, in displaying an object displayed on a screen, the object being an operation target, an operation with respect to the object is detected, and a display mode of displaying the object is changed in accordance with the detected operation. Namely, the present invention is such that the object is moved to and displayed in a second display position by the indicating operation with respect to the object displayed in a first display position. Based on this configuration, for example, if the first object is displayed while overlaying the second object, it is feasible to move the first object and display the whole of the second object with a simple operation.

[0026]

[Preferred Embodiments of the Invention]

Preferred embodiments of the present invention will hereinafter be described with reference to the accompanying drawings. In the

embodiments, an information display system 1 used for a user to browse information existing in a host on a network or in user's own local disk, will be explained.

«First Embodiment»

A first embodiment of the present invention will hereinafter be described based on FIGS. 1 through 15.

[0027]

FIG. 1 is a diagram showing a configuration of a network to which the information display system 1 in the first embodiment has an access. FIG. 2 is a diagram illustrating a hardware configuration of the information display system 1. FIG. 3 is a diagram showing a data structure of a channel table used by the information display system 1. FIG. 4 is a diagram showing an example of display on a single screen in the information display system 1. FIG. 5 is a diagram showing a 2-divided screen. FIG. 6 is a diagram showing a 4-divided screen. FIG. 7 is a diagram showing a 9-divided screen. FIG. 8 is a diagram showing a data structure of a history management table used by the information display system 1. FIG. 9 is a flowchart showing a processing of a browser (a program for browsing the information) executed by a CPU 1 of the information display system 1. FIGS. 10 and 11 are flowcharts each showing an event processing of the browser. FIG. 12 is a flowchart showing a history management processing of the browser. FIG. 13 is a flowchart showing a channel switching processing of the browser. FIG. 14 is a flowchart showing a modified example of the history management processing. FIG. 15 is a diagram showing a history management list used in the modified example of the history management processing.

[0028]

<Configuration of Network>

FIG. 1 is a diagram showing the configuration of the network to which the information display system 1 has the access. As illustrated in FIG. 1, the information display system 1 is connected to servers 2 through 2n (which will be generically referred to as servers 2 etc) via the network.

[0029]

With the information display system 1, the browser utilizing HTTP (Hypertext Transfer Protocol) is executed by a CPU 11. The browser functions to establish a connection with the servers 2 etc in accordance with HTTP. In this state, the browser requests the servers 2 etc to transmit items of information 3a, 3b, 3c or 3d (which will hereinafter called the information 3a etc) possessed by the servers 2 etc, and displays the transmitted information 3a etc.

[0030]

Further, the information display system 1 is capable of displaying items of information 3e and 3f locally possessed by the system 1 itself.

The servers 2 etc have the items of information 3a, 3b, 3c or 3d in an HTML (Hypertext Markup Language) format. The information in the HTML format retains information known as a link for indicating where related information is stored. Therefore, when the user accesses to the information 3a etc via the browser of the information display system 1, the related items of information can be obtained in succession by following the links.

<Hardware Configuration>

FIG. 2 is a diagram showing the hardware configuration of the information display system 1. The information display system 1 includes

the CPU 11 for executing the program, a memory 12 for storing the program executed by the CPU 11 and data processed by the CPU 11, a hard disk 13 for recording the program and the data, a CRT 14 for displaying the information to the user, a keyboard 15 used for the user to input the data, a mouse 16 used for the user to manipulate menus and icons on the CRT 14, and a communication interface 17.

[0031]

The CPU 11 executes the program stored in the memory 12, thereby providing a function as the browser in the information display system 1.

The memory 12 is stored with the program executed by the CPU 11 and the data processed by the CPU 11.

[0032]

The hard disk 13 records the program executed by the CPU 11 and the data processed by the CPU 11.

The CRT 14 displays the data transmitted from the servers 2 etc and the data processed by the CPU 11.

[0033]

The keyboard 15 is used for inputting character data.

The mouse 16 is used for manipulating the menus and icons, and following the links.

The communication interface 17 sends communication data to a communication path or receives the communication data from the communication path in response to a command given from the CPU 11.

<Channel>

With the present information display system 1, the browser is executed by the CPU 11, and the HTML formatted data stored in the servers

2 etc on the Internet or stored in its own hard disk 13 is displayed. The browser identifies, as in the prior art, the displayed data with the aid of URL (Uniform Resource Locator).

[0034]

Further, the browser functions to store a plurality of URLs corresponding to a plurality of channel numbers. The channel number is, as in the case of a TV channel, a number for indicating the information to be displayed.

[0035]

FIG. 3 shows a configuration of the channel table in which the channel numbers and URLs are stored corresponding to each other. This channel table is categorized as a one-dimensional table for retaining URLs in character strings. In the information display system 1 in the first embodiment, the channel table has entries 1 to 9.

[0036]

The channel table is retained on the memory 12, wherein the entry numbers 1 to 9 correspond to addresses on the memory 12. Namely, the CPU 11, when accessing to a specified entry, converts an entry number thereof into an address on the memory 12 and accesses to its area on the memory 12.

[0037]

Further, when finishing the present browser, this channel table is stored as a file and used when starting next time.

Moreover, the entry number corresponds directly to the channel number. Namely, when the information display system 1 is instructed to display items of information identified by the channel numbers 1 to 9, the items of information specified by the respective URLs retained

in the entries 1 through 9, are displayed.

<Screen Layout>

FIG. 4 shows an example of display on the screen of the information display system 1 in the first embodiment.

[0038]

This screen includes a dial object 20 for switching contents of display on the screen, a display area 22 for displaying the information, a channel number display object 23 for identifying the information displayed in the display area 22, and a set of operation buttons 24.

[0039]

In FIG. 4, the dial object 20 is illustrated in enlargement in a position indicated by a dotted-line arrow. The dial object 20 includes the channel numbers and character strings for displaying the numbers of divisions (which will hereinafter be referred to as dial characters) arranged substantially along the circumference, and an indicator 21 rotating about the center, as a rotary axis, of the circumference.

[0040]

The numerals 1 to 9 are given as the channel numbers. Further, the character strings for showing 2-divisions, 4-divisions and 9-divisions are given as the numbers of divisions.

The indicator 21 stops in a position that indicates any one of the numbers 1 to 9 or the character strings representing the 2-divisions, the 4-divisions and the 9-divisions. When the user clicks any one of the numbers 1 to 9 or the character strings representing the 2-divisions, the 4-divisions and the 9-divisions by use of the mouse 16, the indicator 21 moves to the position corresponding to the clicked number or character string.

[0041]

In FIG. 4, the indicator 21 is in the position that indicates the channel number 2. In this case, the information corresponding to the channel number 2 is displayed in the display area 22. An operation mode in which the information corresponding to the single channel is displayed on the single screen, is called a single full screen display.

[0042]

The set of operation buttons 24 consists of a "Back" button, a "Forward" button, a "Stop" button, an "Update" button, a "Favorites" button (for displaying registered pages), and a "Print" button. The user gives instructions to change the display on the screen by clicking the numeral or the character string representing the number of divisions in the dial object 20, or by clicking one of the operation buttons 24. When the user clicks, for example, the channel number 1, or any of 3 through 9 in the dial object 20 in the state shown in FIG. 4, the indicator 21 moves to indicate that number, and the information corresponding to that channel number is displayed in the display area 22.

[0043]

On the other hand, when the user clicks the link contained in the information displayed in the display area 22, the browser functions to detect URL corresponding to the clicked link. Then, the browser stores the detected URL in the entry of the channel table, which is designated by the channel number (the channel 2 in FIG. 2) displayed in the display area 22. Further, the browser acquires the information located by URL and displays the acquired information in the display area 22.

[0044]

FIG. 5 shows a 2-divided screen. When the user clicks the character

string representing the 2-divisions in the dial object 20, the indicator 21 indicates the character string representing the 2-divisions, and the screen of the browser is divided equally by 2 into display areas 22a and 22b. Namely, the thus divided display areas respectively have the same dimensions in the present embodiment.

[0045]

The channel number to be displayed when designating the 2-divisions is the smallest number among the channel numbers displayed so far before designating the 2-divisions, and a channel number next thereto. For example, in FIG. 4, the numeral "2" is indicated as the channel number. In this state, when the 2-divisions is designated, as illustrated in FIG. 5, the items of information corresponding to the channels identified by the channel numbers 2 and 3, are displayed.

[0046]

FIG. 6 shows a 4-divided screen. When the user clicks the character string representing the 4-divisions in the dial object 20, the indicator 21 indicates the character string showing the 4-divisions, with the result that the browser screen is divided equally into four display areas. When designating the 4-divisions, the channel number to be displayed is the smallest number among the channel numbers displayed so far before designating the 4-divisions, and three channel numbers subsequent thereto.

[0047]

For instance, in FIG. 5, the numerals "2" and "3" are shown as channel numbers. When designating the 4-divisions in this state, the items of information corresponding to the channel numbers 2, 3, 4 and 5 are, as shown in FIG. 6, are displayed.

[0048]

FIG. 7 shows a 9-divided screen. When the user clicks the character string representing the 9-divisions in the dial object 20, the indicator 21 indicates the 9-divisions, and the browser screen is equally divided into nine display areas. In the information display system 1 in the present embodiment, the number of channels is 9, and hence, when designating the 9-divisions, all the channels 1 through 9 are displayed in the respective display areas as illustrated in FIG. 7. An operation mode of dividing, as shown in FIGS. 5 to 7, the screen into the plurality of display areas 22a etc and displaying the items of information corresponding to the plurality of channels, is called a screen division display.

[0049]

On the other hand, as shown in FIGS. 5 to 7, when the items of information corresponding the plurality of channels are displayed in the plurality of display areas 22a etc, and when user clicks any one of the channel numbers 1 through 9 in the dial object 20, the indicator 21 turns to a position pointing that clicked number. Then, the display areas 22a etc turn into the single display area 22, whereupon the information corresponding to the clicked channel number is displayed on the single display area 22.

[0050]

Further, as shown in FIGS. 5 through 7, when the items of information corresponding to the plurality of channels are displayed in the plurality of display areas 22a etc, and when the user clicks double the channel number display object 23 in any one of the display areas 22a etc, the display areas 22a etc turn into the single display area 22, whereupon

the information indicated by the channel number display object 23 is displayed in enlargement in the single display area 22.

[0051]

Further, when the user clicks the link contained in the information displayed in the display areas 22a etc, the browser detects URL corresponding to the clicked link. Then, the browser changes URL corresponding to the channel number (the channel 2 in FIG. 4) displayed in the display area 22a etc to the detected URL. Subsequently, the browser acquires the information located by that URL and displays the acquired information in the display area 22a etc.

<Drag & Drop Operation for Link>

As discussed above, according to this information display system 1, when clicking the link in each display areas 22, the information displayed in that display area 22 is changed to an item of information of a destination of the clicked link.

[0052]

On the other hand, as shown in FIGS. 5 to 7, in the state of the screen which is divided into the plurality of display areas 22, when the user drags the link displayed in a certain display area 22a and drops it to other display area 22b etc, the browser displays an item of information of a destination of that link in the display area 22b where the link has been dropped. The "drag" herein connotes an operation of locating a pointer of the mouse 16 at an operation target and moving the operation target in a desired direction by moving the mouse 16 while depressing the button. Further, the "drop" connotes an operation of releasing the button of the mouse 16 after dragging the operation target, and thus taking off the operation target.

[0053]

For instance, in FIG. 5, it is assumed that the user drags a link 25 (a character string in the see detailed drawing) displayed in the display area 22a that corresponds to the channel number 2 and drops it in the display area 22b corresponding to the channel number 3. At this time, the browser recognizes URL corresponding to the dragged link 25 and the channel number 3 corresponding to the display area 22b where the link 25 has been dropped. The browser changes URL corresponding to the channel number 3 in the channel table to the dropped URL, and further displays the information (detailed drawing) corresponding to that URL in the display area 22b corresponding to the channel number 3.

<History Management>

The browser in this information display system 1 retains a history of user's operations in a history management table. The history of the operations is defined as a list of URLs each locating the information displayed by the user.

[0054]

FIG. 8 shows a structure of the history management table. The history management table comprises records each consisting of a history number and URL.

The history number represents how much the operation history possessed by that record is old or new. As this history number is smaller, the operation history becomes older. As this history number is larger, the operation history becomes fresher.

[0055]

In the field of URL, URL locating the information displayed by

that operation is recorded.

Each record in the history management table is accessed by an entry number. The entry number is made correspond to an address of each record on the memory 12.

[0056]

When the user clicks a desired link in the display area 22 corresponding to a channel number n , the browser displays the information related by this link. At this time the browser records URL locating that item of information in the history management table.

[0057]

The history is recorded based on a relationship between the channel number n and the number of existing histories in the following procedures. Namely, if the number of existing histories is larger than a channel number $n-1$, a new history of this time is recorded in an entry recording the oldest history among the existing histories.

[0058]

Whereas if the number of existing histories is smaller than the channel number $n-1$, the history is recorded in an entry of the channel number n .

The browser of the information display system 1 includes a history display button, which is not illustrated. When the user instructs the browser to display the histories by use of the history display button, the browser refers to the history management table and displays the items of information located by URLs sequentially from the latest displayed information (URL), corresponding to the number of the display areas 22 on the screen.

<Operation>

FIGS. 9 through 13 show processing procedures of the browser. The CPU 11 executes the browser, thereby providing a function of the information display system 1.

[0059]

FIG. 9 shows an outline of the processing of the browser. The CPU 11, when starting the browser, to begin with, determines whether a screen division display is indicated or not (S1). When the indicator 21 of the dial object 20 indicates any one of the 2-divisions through the 9-divisions, the screen division display is indicated. On the other hand, when the indicator 21 indicates any one of the channels 1 through 9, the single full screen display is indicated. The CPU 11 refers to a state of the indicator 21 that is retained in the memory 12 and determines whether the screen division display is indicated or not.

[0060]

In the case of the screen division display (Y determination in S1), the CPU 11 divides the screen in accordance with the number of divisions specified by the indicator 2 (S4). Next, the CPU 11 refers to URLs registered in the channel table from the entry number 1, corresponding to the number by which the screen is divided. Then, the items of information located by the URLs are displayed corresponding to the number of screens (S5).

[0061]

Whereas if determined not to be the screen division display in S1, the CPU 11 displays the single screen (S2, the full screen display). Next, the CPU 11 refers to URL having been already registered in the entry number 1 in the channel table, and displays the information located by the URL on the single screen.

[0062]

Subsequently, the CPU 11 comes to a wait-for-event state (S6). The event connotes generally an external factor (e.g., a detection of user's manipulating of the mouse 16) or an internal factor (e.g., an interruption from a timer) for changing a processing state of the browser (or a control state of the CPU 11). When the event occurs (Y determination in S6), the CPU 11 executes an event processing (S7).

[0063]

FIGS. 10 and 11 show details of the event processing. In the event processing, the CPU 11 determines a kind of the occurred event and executes a processing corresponding thereto.

At first, the CPU 11 determines whether a link is clicked or not (S71). When a link is clicked, the CPU 11 displays the information of a link destination on the same display area 22 (S72). Next, the CPU 11 stores URL corresponding to this link in the history management table (S73, history management). Thereafter, the CPU 11 finishes the event processing.

[0064]

Whereas if the event is not clicking of the link (N determination in S71), the CPU 11 determines whether or not the link is dragged (S74). If the link is dragged, the CPU 11 displays the information of that link destination in a display area where the link has been dropped (S75). Next, the CPU 11 stores URL corresponding to that link in the history management table (S76), and finishes the event processing.

[0065]

If the event is not the dragging of the link, the CPU 11 determines whether the event is the dividing indication or not (S77). The event

of the dividing indication occurs when the user clicks the character string representing any one of the 2-divisions through 9-divisions in the dial object 20 by use of the mouse 16. If the event is the dividing indication, the CPU 11 divides the screen of the browser, in accordance with the number of divisions (S78). Then, the CPU 11 refers to URLs registered in the channel table by the number of divisions, and displays the information corresponding thereto in the respective display areas 22. Thereafter, the CPU 11 finishes the event processing.

[0066]

Whereas if the event is not the dividing indication, the CPU 11 determines whether or not the event is an indication of displaying on the single screen (S79). The event of the indication of displaying on the single screen occurs when depressing any one of the channel number display objects 23.

[0067]

If the event is the indication of displaying on the single screen, the CPU 11 executes a processing of displaying on the single screen (S7a).

Whereas if the event is not the indication of displaying on the single screen, the CPU 11 determines whether or not the event is channel switching on the single screen (S7b). The event of the channel switching occurs when depressing a numeral indicating any one of the channel numbers 1 through 9 in the dial object 20.

[0068]

If the event is the channel switching on the single screen, the CPU 11 executes a channel switching processing (S7c).

Note that a common program module is executed both in the processing

of displaying on the single screen and in the channel switching on the single screen. This will hereinafter simply be termed a channel switching processing.

[0069]

If the event is not the channel switching, the CPU 11 determines whether or not the event is an indication of displaying the histories (S7d). If the event is the indication of displaying the histories, the CPU 11 refers to URLs retained in the history management table sequentially from the latest history, corresponding to the number of divisions of the screen (the number of the display areas 22 etc). Then, the URLs are displayed by the number of screen divisions. (S7e).

[0070]

If the event is not the indication of displaying the history, the CPU 11 determines whether or not the event is an indication of finishing the browser (S7f). If the event is the indication of finishing the browser, the CPU 11 finishes the browser. Whereas if the event is not the indication of finishing the browser, the CPU 11 finishes the event processing.

[0071]

FIG. 12 shows details of a history management processing (S73 or S76 in FIG. 10). In the history management processing, the CPU 11 at first determines whether or not the number of histories stored is larger than the number of channels minus 1 (S100). If the number of histories stored is smaller than the number of channels minus 1, the CPU 11 stores a fresh history (URL and a history number) in an entry of which the number is the same as the display channel number in the history management table (S101). At this time, a maximum value among the existing history numbers plus 1 is set as the history number.

[0072]

While on the other hand, if the number of histories stored is larger than the number of channels minus 1, the CPU 11 retrieves an entry of the oldest history (of which the history number is 1) from the history management table. Then, the CPU 11 stores a history (URL and the maximum value among the history numbers) in that entry. Next, the CPU 11 decrements each of the history numbers in other entries by 1 (minus 1).

[0073]

FIG. 13 shows details of the channel switching processing (S7a or S7c in FIG. 11). In the channel switching processing, the CPU 11 at first determines whether or not the browser screen is divided at the present (S110). If the browser screen is divided into a plurality of display areas (Y determination in S110), the display mode on the screen is set to the single full screen display (S111).

[0074]

Next, the CPU 11 switches the screen display to URL of the specified channel (S112). At this time, the CPU 11 emits an effective sound of the channel switching. Thereafter, the CPU 11 comes to an end of processing.

[0075]

As discussed above, in the information display system 1 in the present embodiment, the browser screen is divided into the plurality of display areas, and the items of information (home pages in World Wide Web) corresponding to URLs different from one other, can be displayed in the respective display areas. Therefore, this information display system 1 is convenient for comparing two items of information, e.g.,

information on commercial articles on the Internet by arranging them.

[0076]

Further, a consumption of resources can be more restrained than in the case of executing the plurality of browsers, and besides the areas (display areas) used for displaying the menus can be reduced.

[0077]

Moreover, it is feasible to decrease the time needed for starting a new browser and for designating the information that the user wishes to browse, and to save the labor for the operation.

Further, according to the information display system 1, the user drags and drops the link displayed in one display area to other display area, whereby the information of the link destination can be displayed in the display area where the link has been dropped while keeping the information in the previous display area. Accordingly, the user is, when retrieving plural items of related information by following the links, able to display batchwise these items of related information on the same screen and browse them.

[0078]

Furthermore, the present information display system 1 is capable of retaining the user's operation history and displaying batchwise the information displayed in the past, in the plurality of display areas. The user is, when retrieving the plural items of related information by following the links, therefore able to save the time and labor for getting back to the information displayed in the past. Moreover, in this case, the histories are displayed as ordinary information in the display areas 22 etc, and hence the user is able to easily retrieve the necessary items of information from the operation histories in the

past and display these items of information.

<Modified Example>

With the above-described embodiment, in history management, the entry in the history management table is determined based on the relationship between the number of stored histories and the number of channels, then the history is stored. The embodiment of the present invention is not, however, limited to such procedures of the history management.

[0079]

FIG. 14 shows a modified example of the history management. In this example, a history management list shown in FIG. 15 is used as a substitute for the history management table in FIG. 8.

The history management list in FIG. 15 has a list structure in which a plurality of elements are linked by pointers 50. Each element consists of the pointer 50 and a region 51 for storing URL. The pointers link the elements retaining URLs in the order of being displayed. Therefore, the history management list is capable of retaining the order of being displayed.

[0080]

On the other hand, the region 51 is stored with URL that locates the displayed information. As a result, the history management list is capable of retaining URLs of the displayed information in the order of being displayed.

Further, the element retaining the oldest history in the history management list is pointed by an oldest history pointer 53. Further, the element retaining the latest history in the history management list is pointed by a latest history pointer 54. Therefore, the elements,

which retain the oldest and latest histories in the history management list, are expressly displayed.

[0081]

The elements starting from the element pointed by the oldest history pointer 53 up to the element pointed by the latest history pointer 54, are those having the stored histories. On the other hand, the region from the element next to the element pointed by the latest history pointer 54 to the element before the element pointed by the oldest history pointer 53 is a free region. Thus, in the history management list, the elements for retaining the stored histories and the free region are linked in a ring-like configuration.

[0082]

FIG. 14 shows history management procedures based on this history management list. To begin with, the CPU 11 determines whether or not the history management list contains the free region (S120). The free region corresponds to a region from the element next to the element pointed by the latest history pointer 54 to the element before the element pointed by the oldest history pointer 53.

[0083]

If there is no free region, the CPU 11 retrieves the element that retains the oldest history from the oldest history pointer 53 (S121).

Next, the CPU 11 stores a new history (URL locating the information displayed this time) in the element with the oldest history (S122).

[0084]

Subsequently, the CPU 11 points the element stored with the new history by the latest history pointer 54. Further, the CPU 11 advances the element pointed by the oldest history pointer 53 ahead by one element

in a new direction (S123). Thereafter, the history management comes to an end.

[0085]

Whereas if determined in S120 that there is a free entry, the CPU 11 stores the history (URL locating the information displayed) in the head element of the free region (S124). Herein, the head element of the free region is defined as the element next to the element pointed by the latest history pointer 54. Thus, the head element of the free region can be searched by following the element pointed by the latest history pointer 54.

[0086]

Next, the CPU 11 updates the latest history pointer 54 so as to point the element stored with this history (S125). Thereafter, the history management is finished.

According to the modified example, if it is determined in S120 that there is no free entry, the element of the oldest history is stored with the new history. Instead, if there is no free entry, an element may be ensured fresh on the memory 12.

[0087]

The embodiment discussed above has exemplified the case where the screen is divided by 1, 2, 4 and 9. The embodiment of the present invention is not, however, limited to these numbers of screen divisions.

[0088]

Further, in the embodiment discussed above, the number of channels is set to 9. The embodiment of the present invention is not, however, confined to this number of channels.

In the embodiment discussed above, the mouse 16 is used for dragging

and dropping the operation target. The embodiment of the present invention is not, however, restricted to such configuration. Other pointing device, e.g., a touch panel may also be used in place of the mouse 16.

<Computer Readable Recording Medium>

The program exemplified in this embodiment may be recorded on a computer-readable recording medium. Then, a computer reads the program from this recording medium and executes it, whereby the computer can function as the information display system 1 demonstrated in the present embodiment.

[0089]

Herein, the computer-readable recording medium embraces recording media capable of storing information such as data, programs, etc. electrically, magnetically, optically and mechanically or by chemical action, which can be all read by the computer. What is demountable out of the computer among those recording media may be, e.g., a floppy disk, a magneto-optic disk, a CD-ROM, a CD-R/W, a DVD, a DAT, an 8mm tape, a memory card, etc.

[0090]

Further, a hard disk, a ROM (Read Only Memory) and so on are classified as recording media fixed in the computer.

<Data Communication Signal Embodied in Carrier Wave>

Furthermore, the above program may be stored in the hard disk or the memory of the computer, and distributed to other computers via communication media. In this case, the program is transmitted as data communication signals embodied in carrier waves via the communication media. Then, the computer to which this program has been distributed

can be made function as the information display system 1 in this embodiment.

[0091]

Herein, the communication medium may be any one of cable communication media (such as metallic cables including a coaxial cable and a twisted pair cable, or an optical communication cable), and wireless communication media (such as satellite communications, ground wave wireless communications, etc.).

[0092]

Further, the carrier waves are electromagnetic waves for modulating the data communication signals, or the light. The carrier waves may, however, be DC signals (in this case, the data communication signal takes a base band waveform with no carrier wave). Accordingly, the data communication signal embodied in the carrier wave may be either a modulated broadband signal or an unmodulated base band signal (which corresponds to a case where a DC signal having a voltage of 0 is set as a carrier wave).

《Second Embodiment》

FIGS. 16 and 17 show processing by the information display system 1 in a second embodiment of the present invention.

FIG. 16 is an explanatory diagram showing operation effected on the dial object 20 displayed on the CRT 14 of the information display system 1 in accordance with the present embodiment. FIG. 17 is a flowchart showing a processing for detecting the operation effected on this dial object 20.

[0093]

The first embodiment has exemplified the information display system

1 configured such that the channel table is stored with the plurality of URLs, and switching of the information displayed in one or the plurality of display areas is performed. The channel is switched by clicking any one of the numerals or the character strings representing the 2- through 9-divisions in the dial object 20.

[0094]

In the present embodiment, there will be explained the information display system 1, wherein the indicator 21 in the dial object 20 is turned by manipulating left and right buttons of the mouse 16, and the information displayed in the display area is thus switched. The information display system 1 in this embodiment is substantially the same as the information display system 1 in the first embodiment, except for the operation of the dial object 20. Accordingly, the same components are marked with the same numerals as those in the first embodiment, of which the repetitive explanations are omitted. Further, the discussion might need the reference to the drawings in FIGS. 1 through 15 as the necessity arises.

<Operation of Dial Object 20>

FIG. 16 shows operation of the dial object 20 displayed on the CRT 14.

[0095]

In FIG. 16, the indicator 21 in the dial object 20 indicates the channel number 1. Further, a pointer 26 of the mouse 16 is set on the dial object 20, and the dial object 20 is in an operable state (which will hereinafter be called a focused state). In this focused state, when the user depresses the left button of the mouse 16 (this is called a left click), the indicator 21 turns counterclockwise by one step.

Herein, "one step" implies an angle through which the indicator 21 moves by one element of the dial characters.

[0096]

Further, in the state where the dial object 20 is focused, when the user depresses the right button of the mouse 16 (which is termed a right click), the indicator 21 turns clockwise by one step.

[0097]

Note that when the dial character of the dial object 20 is clicked, the indicator 21 indicates this clicked character (the numeral or the character string). Then, when the indicator 21 of the dial object 20 turns, the display on the browser screen changes as done in the first embodiment.

<Operation and Effect>

FIG. 17 shows the processing of detecting the operation with respect to the dial object 20. When an operation event with respect to the dial object 20 occurs, the CPU 11 executes the processing shown in FIG. 17.

[0098]

To begin with, the CPU 11 determines whether or not the operation is effected on the dial object 20 (S200). If determined not to be the operation on the dial object 20, the CPU 11 determines whether or not the dial character is clicked (S201).

[0099]

When the dial character is clicked, the indicator 21 is moved to a position of this clicked dial character (the numeral or the character string representing any one of the 2- through 9-divisions). Further, the CPU 11 changes the display on the browser screen to the channel indicated or the number of divisions indicated (S202).

[0100]

While on the other hand, if it is determined in S201 that the dial character is not clicked, the CPU 11 executes nothing and finishes the processing of detecting the operation on the dial object 20.

[0101]

In the determination in S200, when detecting the operation on the dial object 20, the CPU 11 next determines whether or not the dial character is clicked by the left button (S203). If clicked by the left button, the CPU 11 turns counterclockwise the indicator 21 of the dial object 20 by one step.

[0102]

Next, the CPU 11 changes the display for the channel or the number of screen divisions after the indicator has turned (S207), and finishes the processing of detecting the operation on the dial object 20.

Whereas if not clicked by the left button in the determination in S203, the CPU 11 determines whether or not the dial character is clicked by the right button (S205). If clicked by the right button, the CPU 11 turns clockwise the indicator 21 of the dial object 20 by one step.

[0103]

Next, the CPU 11 changes the display to the channel or the number of screen divisions after the indicator has turned (S207), and finishes the processing of detecting the operation on the dial object 20.

If not clicked by the right button in the determination in S205, the CPU 11 executes nothing and finishes the processing of detecting the operation on the dial object 20.

[0104]

As discussed above, according to the information display system 1 in the present embodiment, the user turns the indicator 21 of the dial object 20 by manipulating the mouse 16 and is thus able to change the display on the browser. The user is therefore able to change the display on the browser as simply as manipulating a TV channel.

[0015]

Further, the display on the browser can be switched by such a simple operation as setting a position of the mouse cursor on the dial object 20 and performing the left or right click, with the result that the troublesome operations become unnecessary.

<Modified Example>

In the embodiment discussed above, as shown in FIG. 16, the dial object 20 consists of the numerals and the character strings (the dial characters) representing the number of divisions, which are arranged along the circumference, and the indicator 21 turning about the center of the circumference. The embodiment of the present invention is not, however, limited to the configuration itself of the dial object 20 described above. For example, the dial object 20 may also take such a configuration that the object 20 does not include the indicator 21, and an indicated position is shown by reversing the numeral or the character string representing the number of divisions in a black-and-white mode. The indicator 21 may be formed in an annular shape or may include a projection for indicating a specified position.

«Third Embodiment»

A third embodiment of the present invention will hereinafter be discussed with reference to drawings in FIGS. 18 to 27. FIG. 18 is an explanatory diagram illustrating an operation of how the object is moved.

FIG. 19 is a diagram showing a structure of the program in the third embodiment. FIG. 20 is a diagram showing a data structure of a movement destination list used by the information display system 1 in the third embodiment. FIG. 21 is a flowchart showing procedures for a processing of moving the object. FIGS. 22 and 23 are flowcharts each showing procedures for the object moving processing in a modified example 1 of this embodiment. FIG. 24 is an explanatory diagram illustrating how the object is moved in a modified example 2 of this embodiment. FIG. 25 is a flowchart showing procedures for the object moving processing in the modified example 2. FIG. 26 is a diagram showing a structure of the program in a modified example 3 of this embodiment. FIG. 27 is a flowchart showing the object moving processing in a modified example 3.

[0106]

The first and second embodiments have exemplified the information display system 1 in which plural items of information are displayed in the divided display areas 22, and the dial object 20 for switching the information in this type of information display system 1. The discussion in this embodiment will be focused on a function of moving the object that might be an obstacle against displaying other objects to a proper position in the above information display system 1. Other configurations are the same as those in the first or second embodiment, and the drawings in FIGS. 1 through 17 will be referred to according to the necessity.

<Object Moving Function>

FIG. 18 is the explanatory diagram illustrating the operation of how the object is moved. In FIG. 18, the screens 30 and 31 respectively

display an object representing an automobile and a circular object with a numeral 7 therein.

[0107]

This circular object embraces what is displayed for indicating a corresponding channel number in, e.g., the display area described above.

The circular object overlays a part of the automobile on the screen 30. Therefore, a part of the object of the automobile is obstructed in its display. In accordance with this embodiment, there will be explained a function of changing a state as shown on the screen 30 to a state as on the screen 31 by one-touch operation. Namely, when the circular object on the screen 30 is clicked by the mouse 16, the information display system 1 in this embodiment moves the circular object to a specified position and displays it as on the screen 31.

<Structure of Program>

FIG. 19 shows a structure of the program executed by the CPU 11 of the information display system 1. In this information display system 1, the program consists of a window system 40 and an application program 41. What is known as the window system 40 may be Windows by Microsoft Corp., in U.S.A.

[0108]

The window system 40 functions to display the object on the CRT 14 in accordance with instructions by the application program 41. Further, the window system 40 monitors the user's operation involving the use of mouse 16.

[0109]

The application program 41 responds to the user's operation in

accordance with a report 42 given from the window system 40.

When the user clicks a specified object, the window system 40 issues the report 42 to the application program 41 instructing the window system 40 to display the object.

[0110]

The application program 41 receiving this report 42 refers to a movement destination list 43 that defines a destination to which the object is moved, and thus determines the movement destination. Then, the application program 41 gives the window system 40 instructions 44 indicating the movement destination of the object.

[0111]

Based on the instructions 44, the window system 40 displays the object in a position indicated.

<Structure of Movement Destination List 43>

FIG. 20 is a chart showing the movement destination list 43 in which the movement destinations of the object are defined beforehand. This movement destination list 43 is prepared for each object to be displayed. This movement destination list 43 consists of records each composed of fields such as [present position], [moved position] and [order of movements].

[0112]

The field [present position] is stored with a value of 1 in the record corresponding to a present position of the object. Further, the field [present position] is free in the record that does not correspond to the present position of the object.

[0113]

The field [moved position] shows a destination to which the object

is moved. In the information display system 1 in this embodiment, nine positions in the display area 22 are defined as the moved positions. For instance, [left upper end] indicates a position at a left upper corner in the display area 22. Similarly, [right upper end] indicates a position at a right upper corner in the display area 22. Hereinafter, [left lower end] and [middle lower end] likewise indicate positions.

[0114]

The field [order of movements] shows the order of movement when the object concerned is clicked. For example, when the present position is [left upper end], the order of movement is 1. At this time, when the object is clicked, that object is moved to [right upper end] (the order of movement is 2) of which [order of movement] is defined next to the present position.

<Operation>

FIG. 21 shows the object moving processing in the application program 41. The CPU 11 executes this processing, hereby providing a function as the information display system 1 in this embodiment.

[0115]

In this object moving processing, the CPU 11 monitors the user's operation via the window system 40 (S300).

When the user's operation is detected (Y determination in S300), the CPU 11 determines whether or not the object is clicked. If the object is not clicked, the CPU 11 sets the control back to S300, wherein the CPU 11 monitors the user's operation.

[0116]

Whereas if the object is clicked, the CPU 11 acquires the present position of the object (S302). The present position can be acquired

by inquiring the window system 40.

[0117]

Next, the CPU 11 acquires a position of the movement destination with reference to the movement destination list 43 (S303).

Subsequently, the CPU 11 instructs the window system 40 to move the object (S304). The object is thereby moved to a next movement destination defined in the movement destination list 43.

[0118]

Thereafter, the CPU 11 sets the control back to S300, in which the user's operation is monitored.

As discussed above, in the information display system 1 in this embodiment, when the object is clicked, the clicked object is moved to the predetermined movement destination. Therefore, if one object overlays other object, the user is able to move this object by the clicking of the mouse 16. Accordingly, the time and labor for dragging as needed in the prior art can be simplified. Further, unlike the prior art, the display configuration needs neither the deletion of the overlaying object nor the icon symbolization, and hence the object required to be displayed can be displayed so as not to obstruct other objects.

[0119]

Further, when the present embodiment is realized by way of the first embodiment, the double-clicks on the circular object are used for changing the display area, and therefore a contrivance may be such that the clicking operation in this embodiment is conducted by use of, e.g., the right button so as not to overlap with the clicking in the first embodiment.

<Modified Example 1 of Moving Processing>

FIG. 22 shows a modified example 1 of the object moving processing. In the information display system 1 in the third embodiment, the CPU 11 determines the movement destination of the object with reference to the movement destination list 43. The embodiment of the present invention is not, however, limited to the above procedures for determining the movement destination. For instance, in the procedures shown in FIG. 22, the movement target object is moved to a free area where no other object is displayed.

[0120]

In FIG. 22, the determinations in S300 and S301 are the same as those in FIG. 21, and hence their repetitive explanations are omitted.

In FIG. 22, when the click on the object is detected, the CPU 11 detects a free area on the screen (S312).

[0121]

Next, the application program 41 instructs the window system 40 to move the object to that free area (S313). The object is thereby moved to the free area. Thereafter, the CPU 11 sets the control back to S300, wherein the user's operation is monitored.

[0122]

FIG. 23 shows details of a free area searching processing. The free area can be recognized by the application program 41 inquiring the window system 40.

The CPU 11, to start with, inquires the window system 40 and acquires a list of the objects managed by the window system 40 (S3121).

[0123]

Next, the CPU 11 inquires the window system 40 and acquires areas where the respective objects exist on the screen (S3122).

Subsequently, the CPU 11 obtains areas excluding the respective object-existing areas on the screen. This involves, for example, the use of pixel arrays on the screen, e.g., 1024 x 1024 arrays, and those areas can be obtained by putting check marks on the pixels corresponding to the respective object-existing areas on the screen and by connecting the pixels with no check mark. Such a connection can be expressed by use of, e.g., Run-Length method known as an image processing method.

[0124]

Next, the CPU 11 obtains a maximum free area (in which run lengths is maximum in X- and Y-directions) from the above areas, and determines this area as a free area (S3124). Thereafter, the CPU 11 finishes the free area searching processing.

[0125]

Note that as a method other than the method described above, for example, the CPU 11 may obtain a free area from data on a VRAM not illustrated by scanning the VRAM.

<Modified Example 2 of Moving Processing>

FIGS. 24 and 25 show a modified example 2 of the object moving method. In the third embodiment, the movement destination list 43 is stored with the movement destinations of the object and the order of the movements, and the movement target object is moved according to this order. As a substitute for this mode, (X- and Y-directional) moving quantities of the object are retained, and the movement target object may be moved by these moving quantities.

[0126]

FIG. 24 illustrates an object that is moved in this way. When the user clicks the circular object with a numeral 2 therein, this circular

object is moved a predetermined distance on the screen. If a moving position shifts beyond the display area in the X- or Y-direction, the moving position is set back by one screen. Thus, a moving locus of the moving circular object is depicted by dotted arrow lines.

[0127]

FIG. 25 shows a processing executed by the CPU in that case. The determinations in S300 and S301 are the same as those in FIG. 21, and hence their repetitive explanations are omitted.

In FIG. 25, when the click on the object is detected, the CPU 11 reads moving quantities (Δx , Δy) from a moving quantity table, which is not illustrated, stored in the memory 12 (S322).

[0128]

Next, the CPU 11 calculates a moving position (S323). The moving position can be obtained by the following formulae.

After-movement X coordinates = Mod (before-movement X coordinates + Δx , X-directional screen size)

After-movement Y coordinates = Mod (before-movement Y coordinates + Δy , Y-directional screen size)

Here, Mod (A, B) is a remainder when A is divided by B. Accordingly, the coordinates after being moved invariably fall within the screen range.

[0129]

Next, the CPU 11 moves the movement target object to X, Y after the movement (S324).

The moving quantity table may individually prepared for every object and may also be shared with a plurality of objects. For example, one kind of moving quantity table is prepared in the information display

system 1 and may be shared with all the objects.

[0130]

Further, one kind of moving quantity table is prepared in the program for displaying the plurality of objects and may be shared with the objects displayed in that program.

<Modified Example 3 of Moving Processing>

In the third embodiment discussed above, the object is moved based on the processing of the application program 41 for displaying the object. The embodiment of the present invention is not, however, confined to this mode of moving the object on the basis of the instructions given from the application program 41.

[0131]

FIG. 26 shows a configuration of a program for moving the object by the processing of the window system 40 through no intermediary of the processing of the application program 41 in the information display system 1 (the modified example 3).

[0132]

In the information display system 1, when detecting the user's operation with respect to a specified object by use of the mouse 16, the window system 40 refers to the movement destination list 43. Then, the window system 40 determines a destination to which the object is moved on the basis of the definitions in the movement destination list 43. The window system 40 writes the movement destination, to which the display position of the object is moved, in a window system database (which is, for instance, called Registry in Windows defined as a window system by Microsoft Corp., in U.S.A). Then, the window system 40 re-displays the object. This object is thereby displayed in the movement

destination.

[0133]

FIG. 27 shows the processing of the window system 40 that is executed by the CPU11 in this case. In FIG. 27, the determinations in S300 and S301 are the same as those in FIG. 21, and hence the repetitive explanations are omitted.

[0134]

In FIG. 27, when detecting the click on the object, the CPU 11 retrieves a destination where the object is moved (S332). In this case, the movement destination may be, as in the third embodiment, defined in the movement destination list 43 or in the moving quantity table as in the modified example 2.

[0135]

Next, the CPU 11 rewrites contents of Registry indicating the display positions of the objects (S333). Namely, the CPU 11 changes the coordinates of the display position to coordinates of the movement destination.

[0136]

Subsequently, the CPU re-displays the object (S334). The object is thereby displayed in that movement destination.

Note that Windows by Microsoft Corp, in U.S.A is assumed as the window system 40, and Registry is assumed as the database of the window system in this modified example. The embodiment of the present invention is not, however, limited to Windows. For example, the present invention can be also embodied in X Window System typical in UNIX system, and in OSF/Motif.

<Modified Example of Hardware>

In the embodiment discussed above, the clicking by the mouse 16 is detected as the instructions for moving the operation target. The embodiment of the present invention is not, however, restricted to such configuration. Other pointing device, e.g., a touch panel is used as a substitute for the mouse 16, and one-touch operation on the object may also be detected. Further, the object may be moved based on specific signals of a remote controller utilizing electromagnetic waves such as infrared-rays etc. That is, the information display system 1 includes a light receiving unit for receiving the electromagnetic waves from this remote controller, and, when the light receiving unit detects the signal (electromagnetic waves) generated by depressing a specified push button of the remote controller, a specified object may also be moved.

<Other Modified Examples>

In the third embodiment, the movement destination list 43 is prepared for every object. Instead of this, the movement destination list 43 may be shared with the plurality of objects. For example, one kind of movement destination list 43 is prepared in the information display system 1 and may also be shared with all the objects.

[0137]

Further, one kind of movement destination list 43 is prepared in the program for displaying the plurality of objects and may be shared with the objects displayed in this program.

《Others》

The present embodiments disclose the following inventions.

(Note 1) An information display system comprising:

a display unit including a plurality of display areas formed by dividing a predetermined area;

an operation unit for designating an item of information to be displayed in each of said display areas;

an acquiring unit for acquiring the designated item of information;
and

a control unit having the acquired information displayed in the corresponding display area.

(Note 2) An information display system according to note 1, wherein said acquiring unit includes a communication unit and acquires the information by accessing to a network.

(Note 3) An information display system according to note 1, further comprising a history storing unit for storing display histories of items of information displayed,

wherein the items of information stored as the display histories are displayed in a predetermined order in said respective display areas.

(Note 4) An information display system according to note 1, wherein when a first item of information displayed in a first display area is related to a second item of information, and when the second item of information is designated to be displayed, the second item of information is displayed in a second display area while keeping the display of the first item of information in said first display area.

(Note 5) An information display system according to note 4, wherein the first item of information is related to the second item of information by use of a specified keyword, and when the keyword is dragged and dropped to said second display area, the second item of information is displayed.

(Note 6) An information display system according to note 1, wherein said display unit displays identifying information for

identifying said display area, and

said control unit, when the identifying information corresponding to the display area is designated through said operation unit, enlarges said display area corresponding to the identifying information and displays only said single display area.

(Note 7) An information display system according to note 6, wherein the identifying information is displayed within said display area identified by the identifying information, and

when said operation unit detects an indicating operation with respect to the identifying information, said display area corresponding to the identifying information is enlarged.

(Note 8) An information display system according to note 6, wherein when said operation unit detects an indication operation with respect to the identifying information, said enlarged single display area is turned into a plurality of display areas.

(Note 9) An information display system comprising:

a display unit for displaying a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information;

a detection unit for detecting an operation of an operation unit with respect to said turn object; and

a control unit for turning said indicator in accordance with the detected operation.

(Note 10) An information display system according to note 8,

wherein said operation unit is a pointing device having at least two pieces of buttons, and

said indicator turns counterclockwise by depressing a first button and turns clockwise by depressing a second button.

(Note 11) An information display system according to note 10, wherein said two buttons are right and left buttons, said first button is the left button, and said second button is the right button.

(Note 12) An information display system comprising:
a communication unit for acquiring information by accessing to a network;

a display unit for displaying the acquired information;

a correspondence storage unit for making an item of identifying information correspond to a specified item of information; and

a control unit for displaying, in a display area, the information acquired from the network via said communication unit,

wherein said display unit includes a display area for displaying the information and a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information, and

said control unit detects an operation of an operation unit with respect to said turn object, turns said indicator in accordance with the detected operation, and displays the information corresponding to the identifying information indicated in a position to which said indicator is turned.

(Note 13) An information display system according to note 12, wherein said turn object has pieces of information arranged along said substantially circumferential shape and each representing the

number of divisions by which the display area of said display unit is divided, and

when said indicator is turned to the position of indicating the information representing the number of divisions, the display area is divided by this number of divisions, and plural items of information are displayed in the divided display areas.

(Note 14) An information display system comprising:

a display unit for displaying an object including an indicator for indicating any one piece of identifying information among plural pieces of identifying information;

a detection unit for detecting contents of an indicating operation of an operation unit with respect to said object; and

a control unit for changing the identifying information indicated by said indicator in accordance with the detected contents of the indicating operation.

(Note 15) An information display system comprising:

a display unit for displaying an object displayed on a screen, the object being an operation target; and

a control unit for detecting an indicating operation by an operation unit with respect to said object, and for changing a display mode of displaying said object on said display unit in accordance with the detected indicating operation,

wherein said object displayed in a first display position is moved to and displayed in a second display position by the indicating operation.

(Note 16) An information display system according to note 15, wherein said operation unit is a mouse, and the indicating operation is a click on said object.

(Note 17) An information display system according to note 15, wherein said operation unit is a touch panel, and the indicating operation is one-touch operation on said object.

(Note 18) An information display system according to note 15, wherein said operation unit is a remote controller having a push button, and the indicating operation is a depressing operation on the push button.

(Note 19) A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

forming a plurality of display areas by dividing a predetermined area;

designating information to be displayed in the display area;

acquiring a designated item of information; and

displaying the acquired information in the display area corresponding thereto.

(Note 20) A computer-readable storage medium with a recorded program according to note 19, for further executing a step of acquiring the information by accessing to a network.

(Note 21) A computer-readable storage medium with a recorded program according to note 19, for further executing a step of storing display histories of items of information displayed,

wherein the items of information stored as the display histories are displayed in a predetermined order in the respective display areas.

(Note 22) A computer-readable storage medium with a recorded program according to note 19, for further executing a step of, when a first item of information displayed in a first display area is related to a second item of information, and when the second item of information is designated to be displayed, displaying the second item of information

in a second display area while keeping the display of the first item of information in said first display area.

(Note 23) A computer-readable storage medium with a recorded program according to note 22, wherein the first item of information is related to the second item of information by use of a specified keyword, and when the keyword is dragged and dropped to said second display area, the second item of information is displayed.

(Note 24) A computer-readable storage medium with a recorded program according to note 19, for further executing the following steps of:

displaying identifying information for identifying said display area; and

detecting an operation with respect to the identifying information, wherein when the identifying information corresponding to the display area is designated, said display area corresponding to the identifying information is enlarged, and only said single display area is displayed.

(Note 25) A computer-readable storage medium with a recorded program according to note 24, for further executing the following steps of;

displaying the identifying information within said display area identified by the identifying information, and

when detecting an indicating operation with respect to the identifying information, enlarging said display area corresponding to the identifying information.

(Note 26) A computer-readable storage medium with a recorded program according to note 25, wherein when detecting the indication

operation with respect to the identifying information, said enlarged single display area is turned into a plurality of display areas.

(Note 27) A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

displaying a turn object which has pieces of identifying information arranged along substantially a circumferential shape and an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information;

detecting an operation with respect to said turn object; and
turning said indicator in accordance with the detected operation.

(Note 28) A computer-readable storage medium with a recorded program according to note 27,

wherein the operation is an operation of a pointing device having at least two pieces of buttons, and

an indicator is turned counterclockwise by depressing a first button and turned clockwise by depressing a second button.

(Note 29) A computer-readable storage medium with a recorded program according to note 28,

wherein said two buttons are right and left buttons,

said first button is the left button, and said second button is the right button.

(Note 30) A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

acquiring information by accessing to a network;

forming a display area for displaying the information;

displaying a turn object which has pieces of identifying information arranged along substantially a circumferential shape and

an indicator which turns about the center of the circumferential shape and indicates any one piece of identifying information;

making the identifying information correspond to a specified item of information;

detecting an operation with respect to said turn object;

turning said indicator in accordance with the detected operation;

and

displaying, in said display area, the information corresponding to the identifying information indicated in a position to which said indicator is turned.

(Note 31) A computer-readable storage medium with a recorded program according to note 30,

wherein said turn object has pieces of information arranged along substantially a circumferential shape and each representing the number of divisions by which the display area of said display unit is divided, and

when said indicator is turned to the position of indicating the information representing the number of divisions, the display area is divided by this number of divisions, and plural items of information are displayed in the divided display areas.

(Note 32) A computer-readable storage medium with a recorded program consisting of the following steps of:

displaying an object including an indicator for indicating any one piece of identifying information among plural pieces of identifying information;

detecting contents of an indicating operation with respect to said object; and

changing the identifying information indicated by said indicator in accordance with the detected contents of the indicating operation.

(Note 33) A computer-readable storage medium with a recorded program for a computer to execute the following steps of:

displaying an object displayed on a screen, the object being an operation target;

detecting an indicating operation with respect to the object; and

changing a display mode of displaying said object in accordance with the detected indicating operation,

wherein said object is moved to and displayed in a second display position when detecting the indicating operation with respect to said object displayed in a first display position.

(Note 34) A computer-readable storage medium with a recorded program according to note 33,

wherein said computer includes a mouse, and

the indicating operation is a click on said object.

(Note 35) A computer-readable storage medium with a recorded program according to note 33,

wherein said computer includes a touch panel, and

the indicating operation is one-touch operation on said object.

(Note 36) A computer-readable storage medium with a recorded program according to note 33,

wherein said computer includes a communication unit with a remote controller having a push button, and

the predetermined operation is a depressing operation on the push button.

[0138]

[Effects of the Invention]

As discussed above, according to the present invention, the plurality of display areas are formed, and the plural items of information are displayed in the respective display areas. Therefore, the items of information related by links can be efficiently displayed. Further, the two contents can be thereby easily compared with each other.

[0139]

Moreover, according to the present invention, the operation effected on the turn object is detected, and the indicator is turned in accordance with this operation. Then, the information corresponding to the identifying information indicated in the position to which the indicator is turned, is displayed in the display area, and hence the plural items of information can be displayed by simply switching them.

[0140]

Further, according to the present invention, for the object displayed in the first display position, when the predetermined operation effected on the object displayed in that position is detected, this object is moved to and displayed in the second display position. Therefore, if the plurality of objects are overlapped, the overlap of the two objects can be easily obviated.

[Brief Description of the Drawings]

[FIG. 1] A diagram showing a configuration of a network in a first embodiment of the present invention.

[FIG. 2] A diagram illustrating a hardware configuration of an information display system 1 in the first embodiment of the present invention.

[FIG. 3] A diagram showing a data structure of a channel table.

[FIG. 4] A diagram showing an example of display on a single screen.

[FIG. 5] A diagram showing a 2-divided screen.

[FIG. 6] A diagram showing a 4-divided screen.

[FIG. 7] A diagram showing a 9-divided screen.

[FIG. 8] A diagram showing a data structure of a history management table.

[FIG. 9] A flowchart showing a processing of a browser.

[FIG. 10] A flowchart (1) showing an event processing of the browser.

[FIG. 11] A flowchart (2) showing the event processing of the browser.

[FIG. 12] A flowchart showing a history management processing of the browser.

[FIG. 13] A flowchart showing a channel switching processing of the browser.

[FIG. 14] A flowchart showing a modified example of the history management processing.

[FIG. 15] A diagram showing a history management list.

[FIG. 16] An explanatory diagram showing an operation effected on the dial object 20.

[FIG. 17] A flowchart showing a processing of detecting the operation effected on the dial object 20.

[FIG. 18] An explanatory diagram showing the operation of moving the object.

[FIG. 19] A diagram showing a structure of a program in a third embodiment.

[FIG. 20] A chart showing a data structure of a movement destination list.

[FIG. 21] A flowchart showing procedures for the object moving processing.

[FIG. 22] A flowchart showing procedures for the object moving processing in a modified example 1.

[FIG. 23] A flowchart showing a free region searching processing.

[FIG. 24] An explanatory diagram showing how the object is moved in a modified example 2.

[FIG. 25] A flowchart showing the object moving processing in the modified example 2.

[FIG. 26] A diagram showing a structure of the program in a modified example 3.

[FIG. 27] A flowchart showing the object moving processing in the modified example 3.

[Description of Reference Numerals]

1 INFORMATION DISPLAY SYSTEM

11 CPU

12 MEMORY

13 HARD DISC

14 CRT

15 KEYBOARD

16 MOUSE

20 CHANNEL OBJECT

21 INDICATOR

22 DISPLAY AREA

23 CHANNEL NUMBER DISPLAY OBJECT

[Name of Document]

ABSTRACT

[Abstract]

[Object]

The object of the present invention is to provide an information display system capable of efficiently browsing items of information related by links.

[Solving Means]

The present invention is such that, in displaying the information acquired by accessing to a network, a plurality of display areas are formed, and plural items of information are displayed in the respective display areas.

In this case, a display history of the information displayed may be stored, and the items of information displayed at the present or in the past may be displayed in a predetermined order in the respective display areas.

Further, when a first item of information displayed in a first display area is related to a second item of information, and when a second item of information is designated to be displayed, the second item of information may be displayed in a second display area while keeping the display of the first item of information in the first display area.

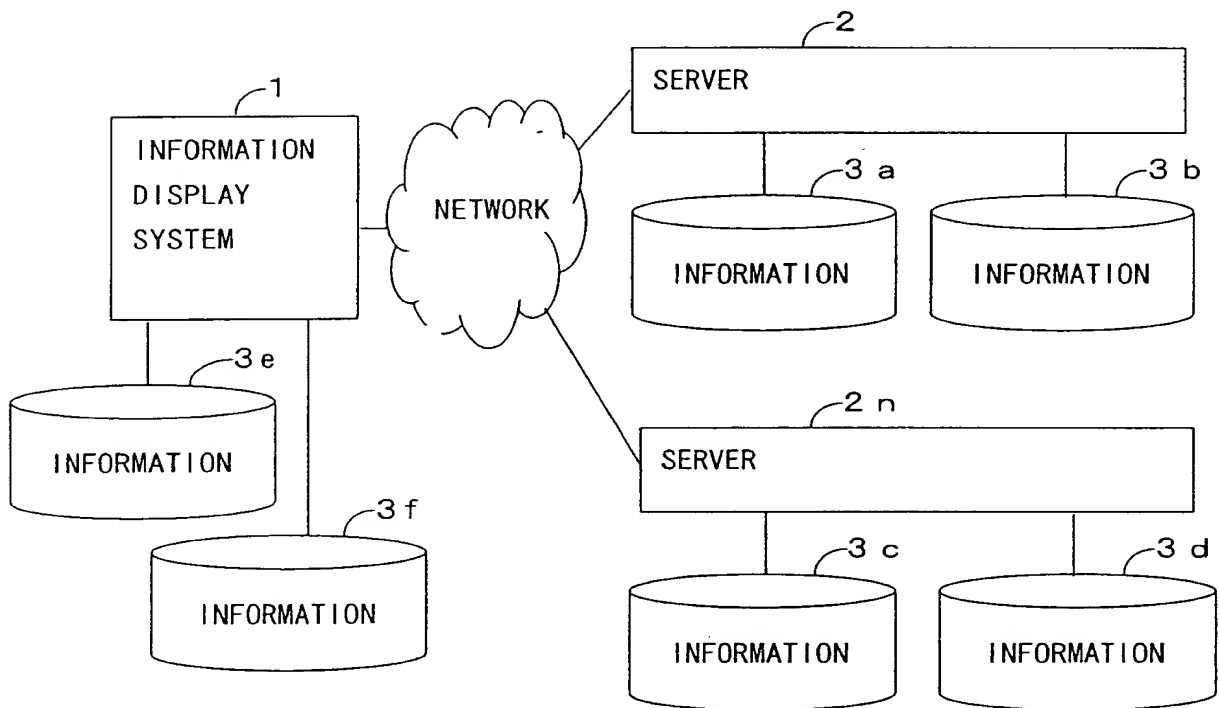
[Selected Drawing]

FIG. 1

[FIG. 1]



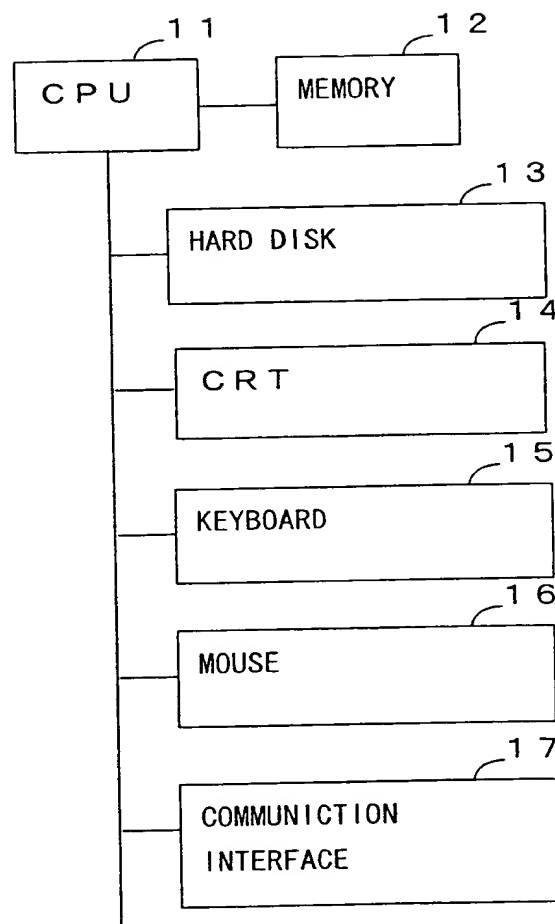
Network Configuration



[FIG. 2]



Hardware Configuration

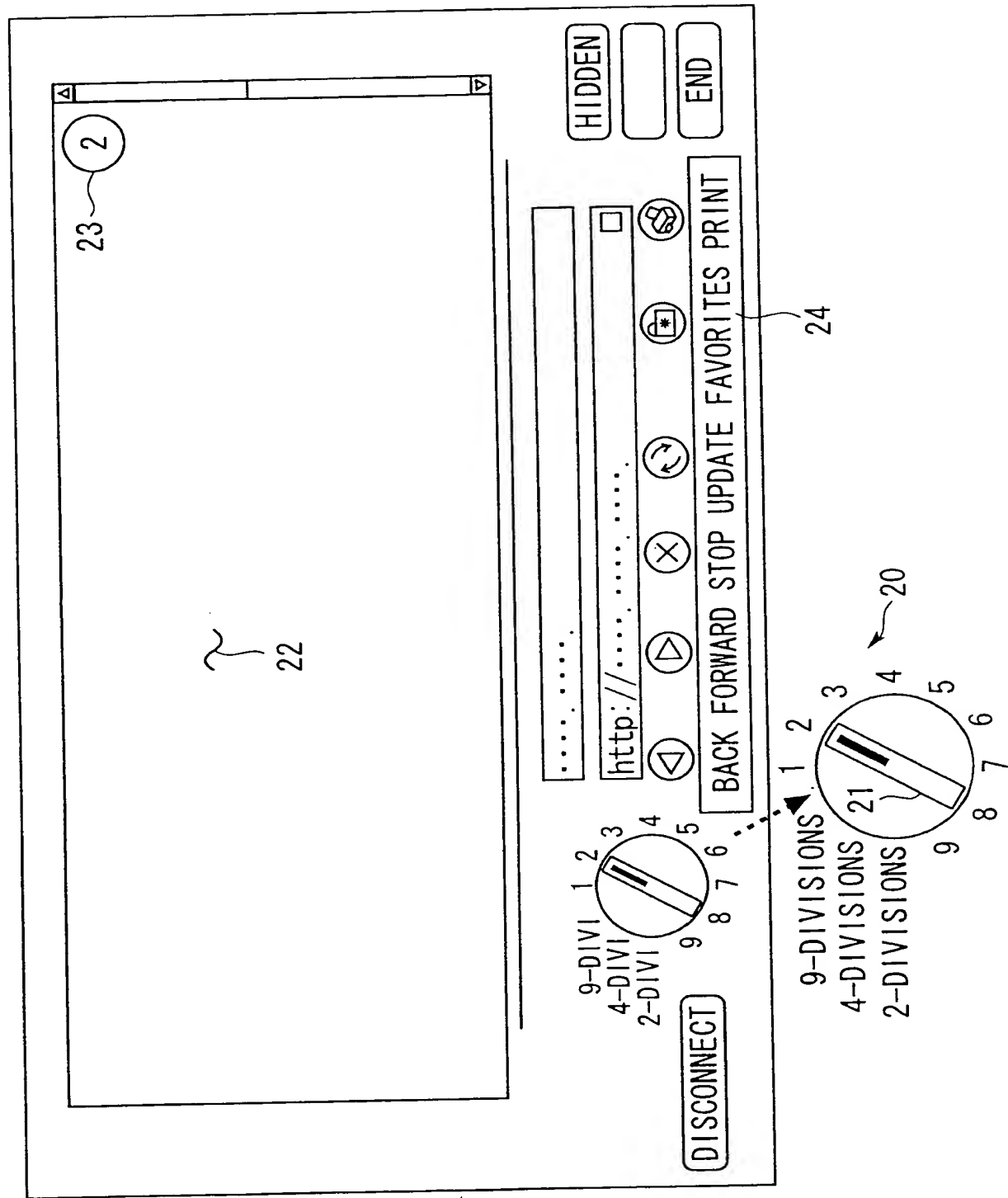




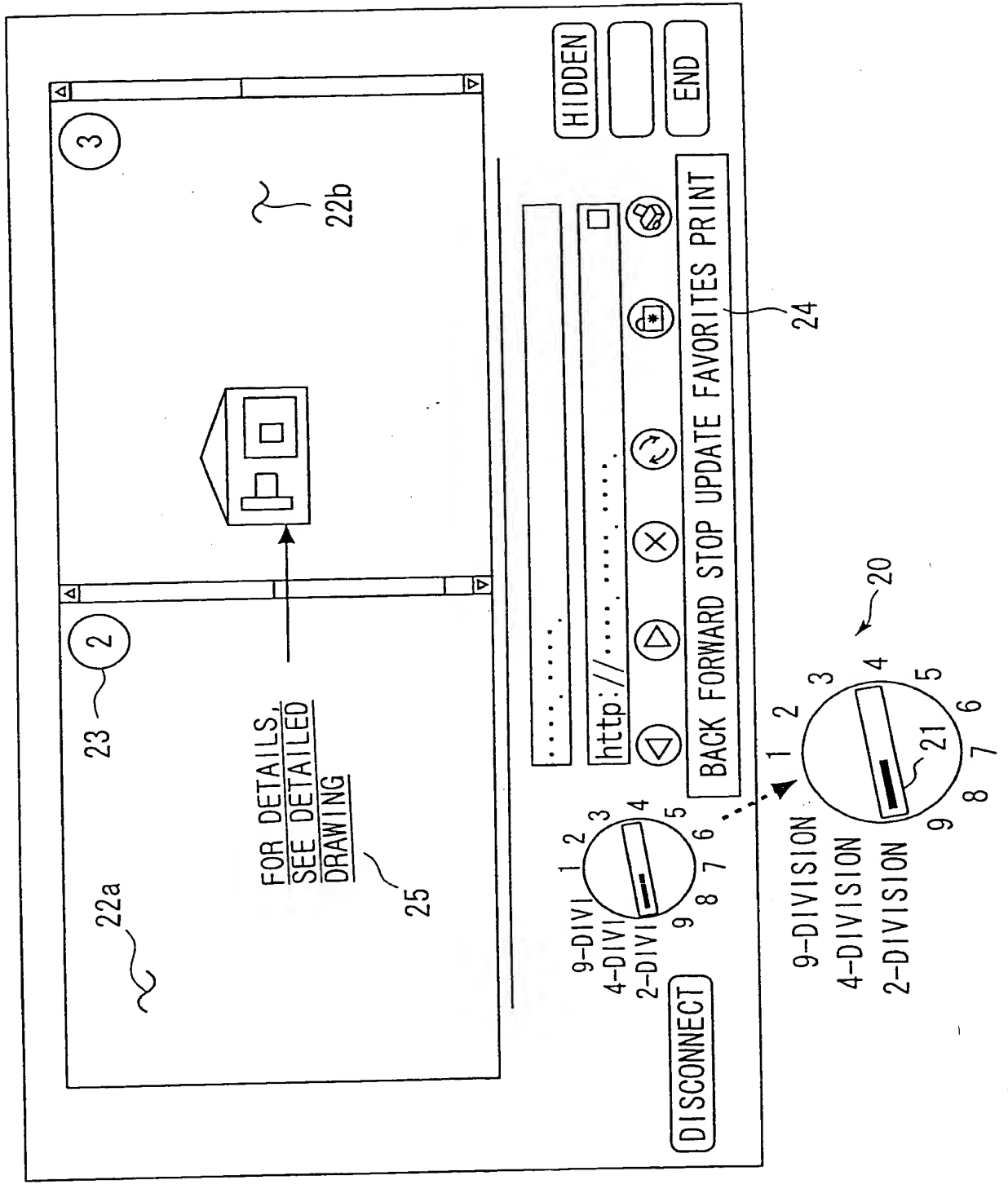
Channel Table

| ENTRY NUMBER (CHANNEL NUMBER) | U R L |
|----------------------------------|---|
| 1 | http://www.xxxxxx1.co.jp |
| 2 | http://www.xxxxxx2.co.jp |
| 3 | http://www.xxxxxx3.co.jp |
| : | : |
| : | : |
| 9 | http://www.xxxxxx9.co.jp |

Example of Display on a Single Screen

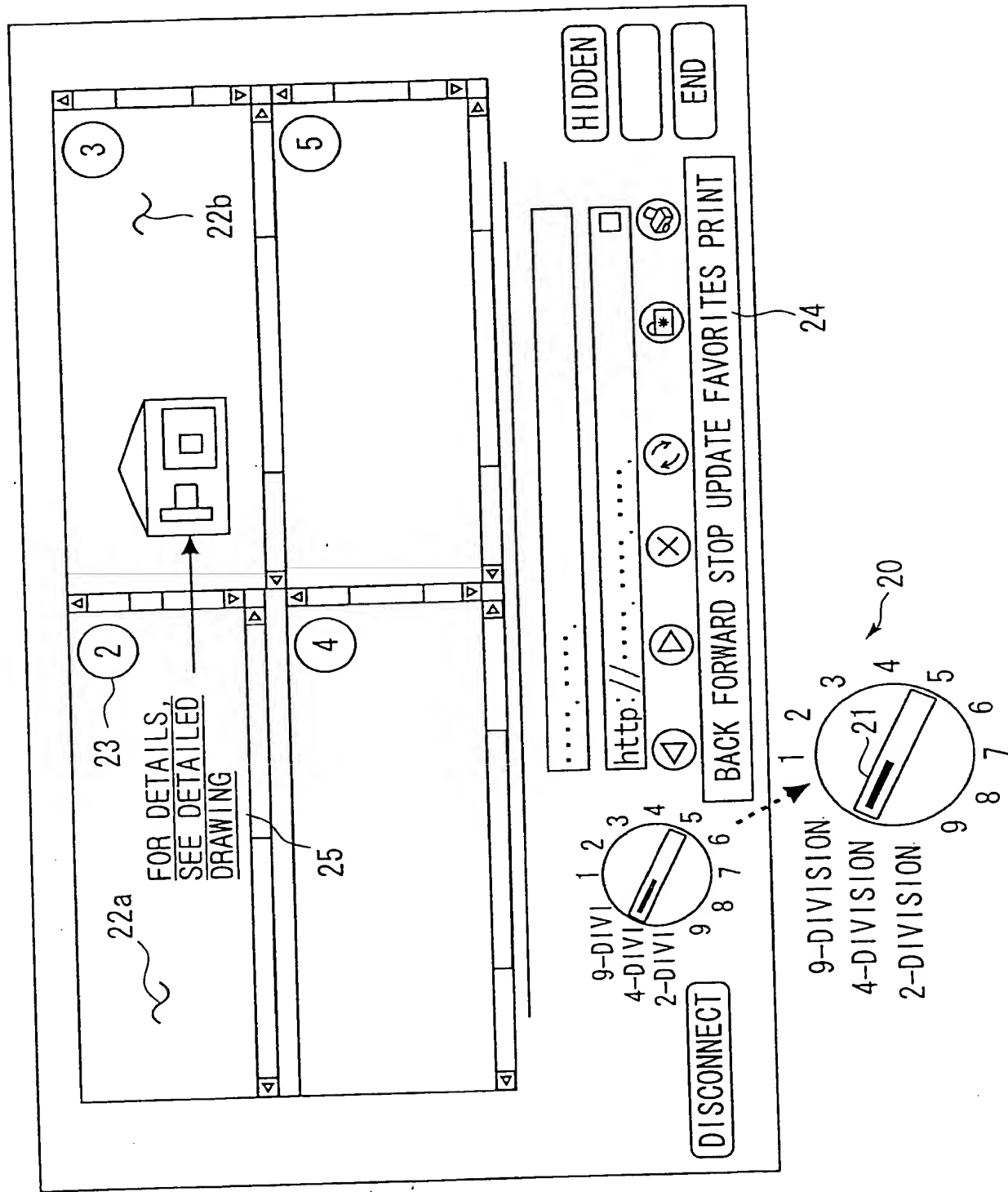


Example of a 2-division Screen



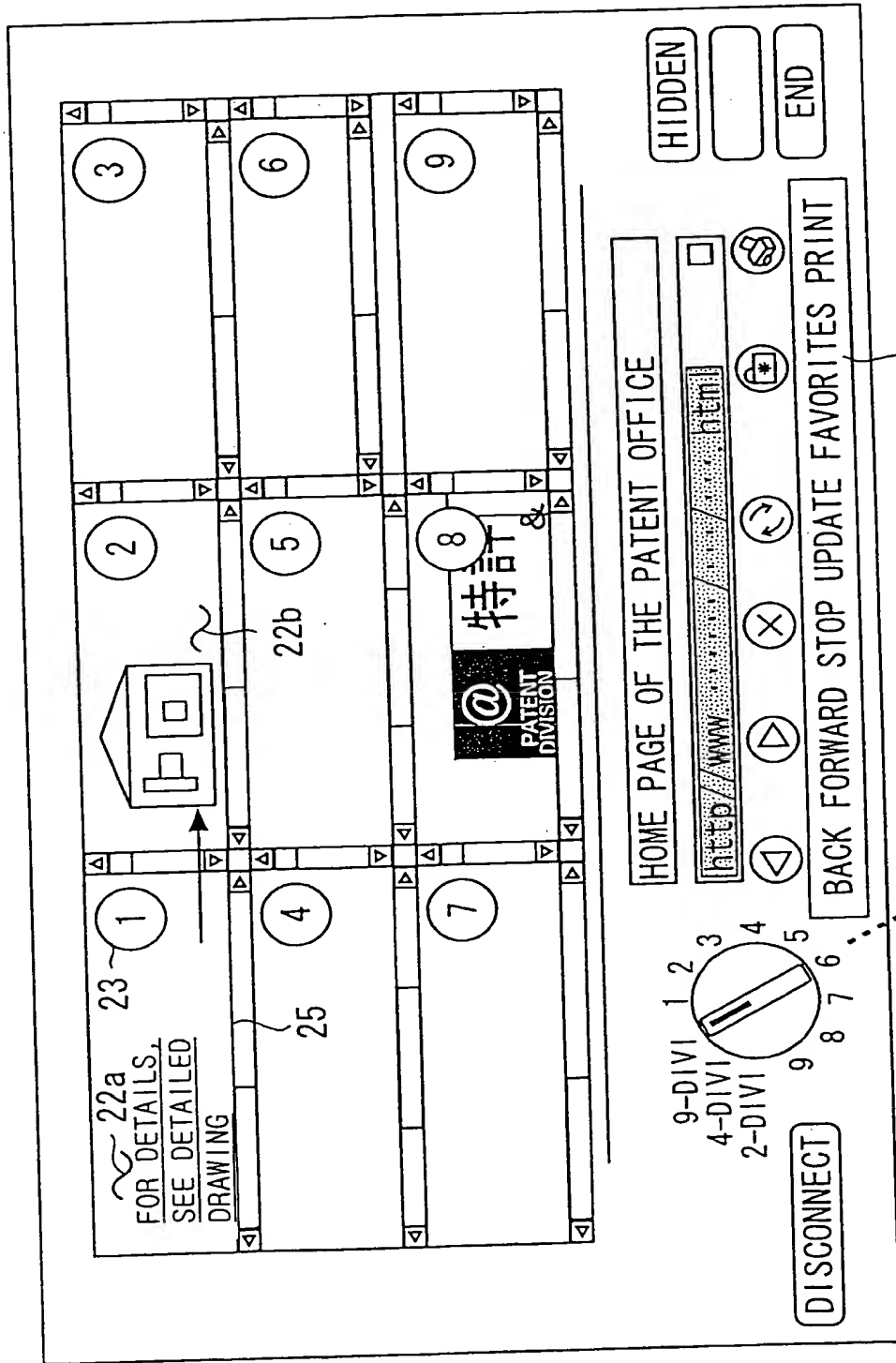
[FIG. 6]

Example of a 4-division Screen



[FIG. 7]

Example of a 9-division Screen



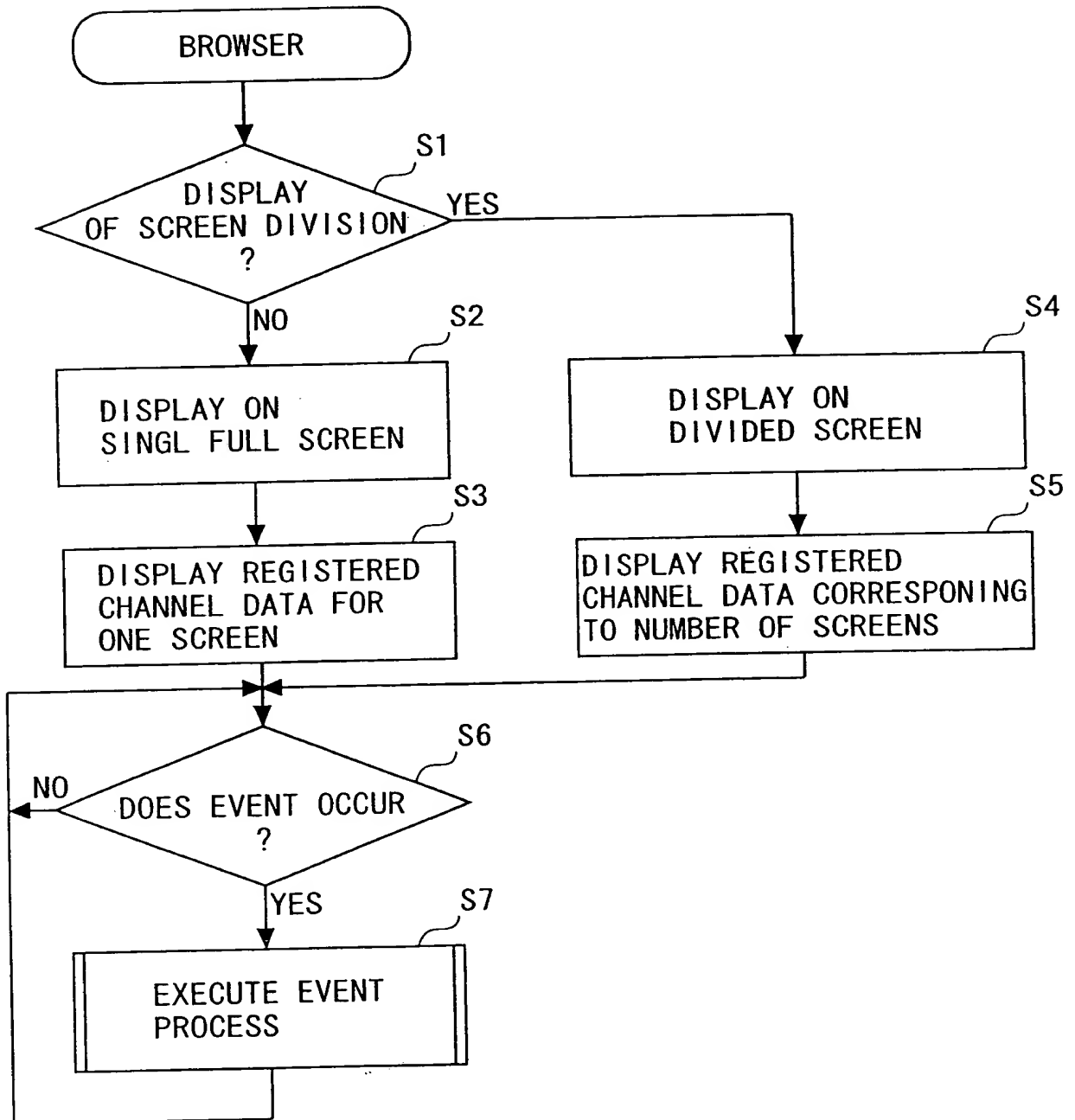


History Management Table

| ENTRY NUMBER | HISTORY NUMBER | URL |
|--------------|-------------------|--------------------------|
| 1 | 1 | http://www.xxxxxx1.co.jp |
| 2 | 4 | http://www.xxxxxx4.co.jp |
| 3 | 2 | http://www.xxxxxx2.co.jp |
| : | : | : |
| : | : | : |
| 9 | 3 | http://www.xxxxxx3.co.jp |

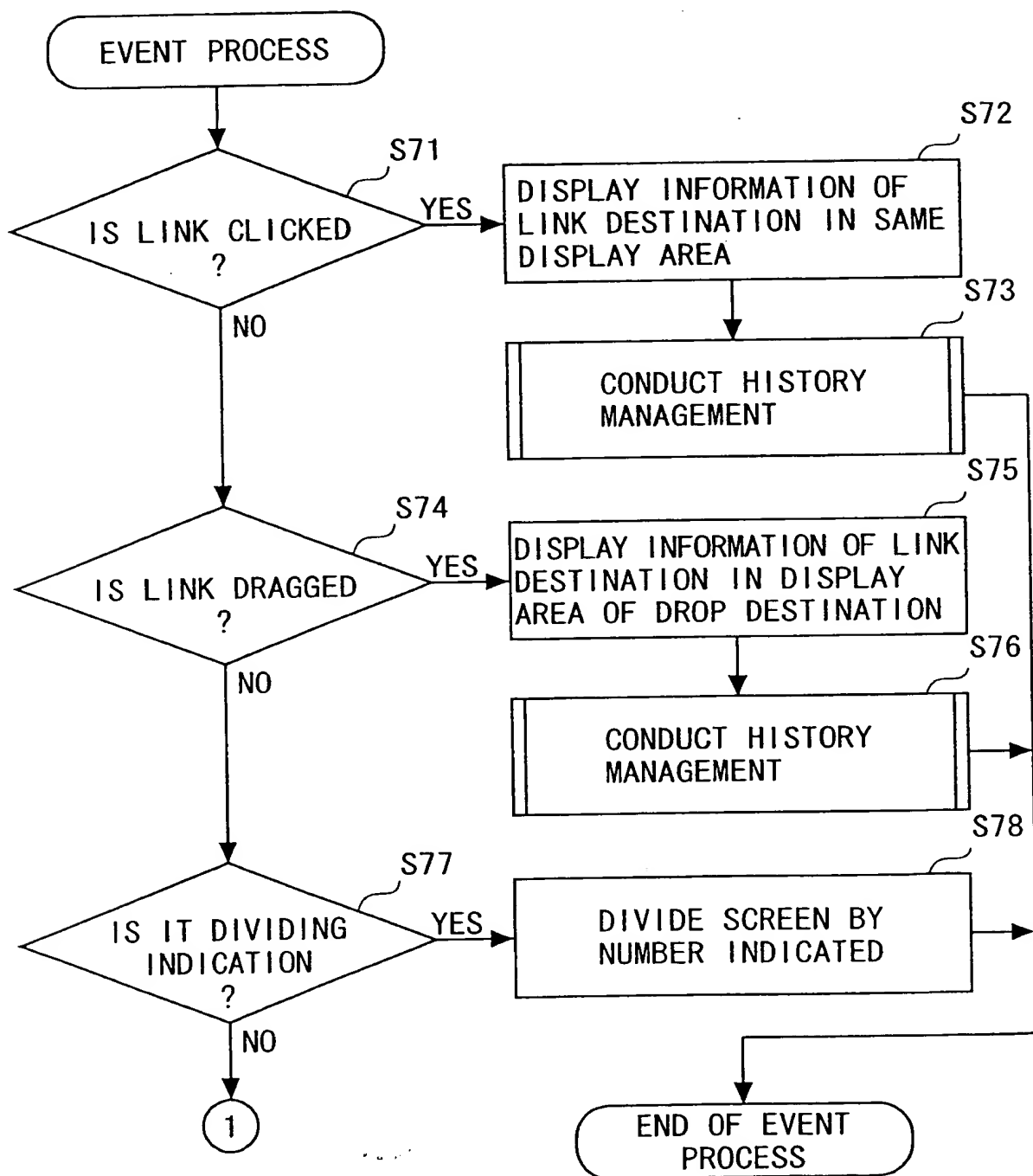


Processing of a Browser



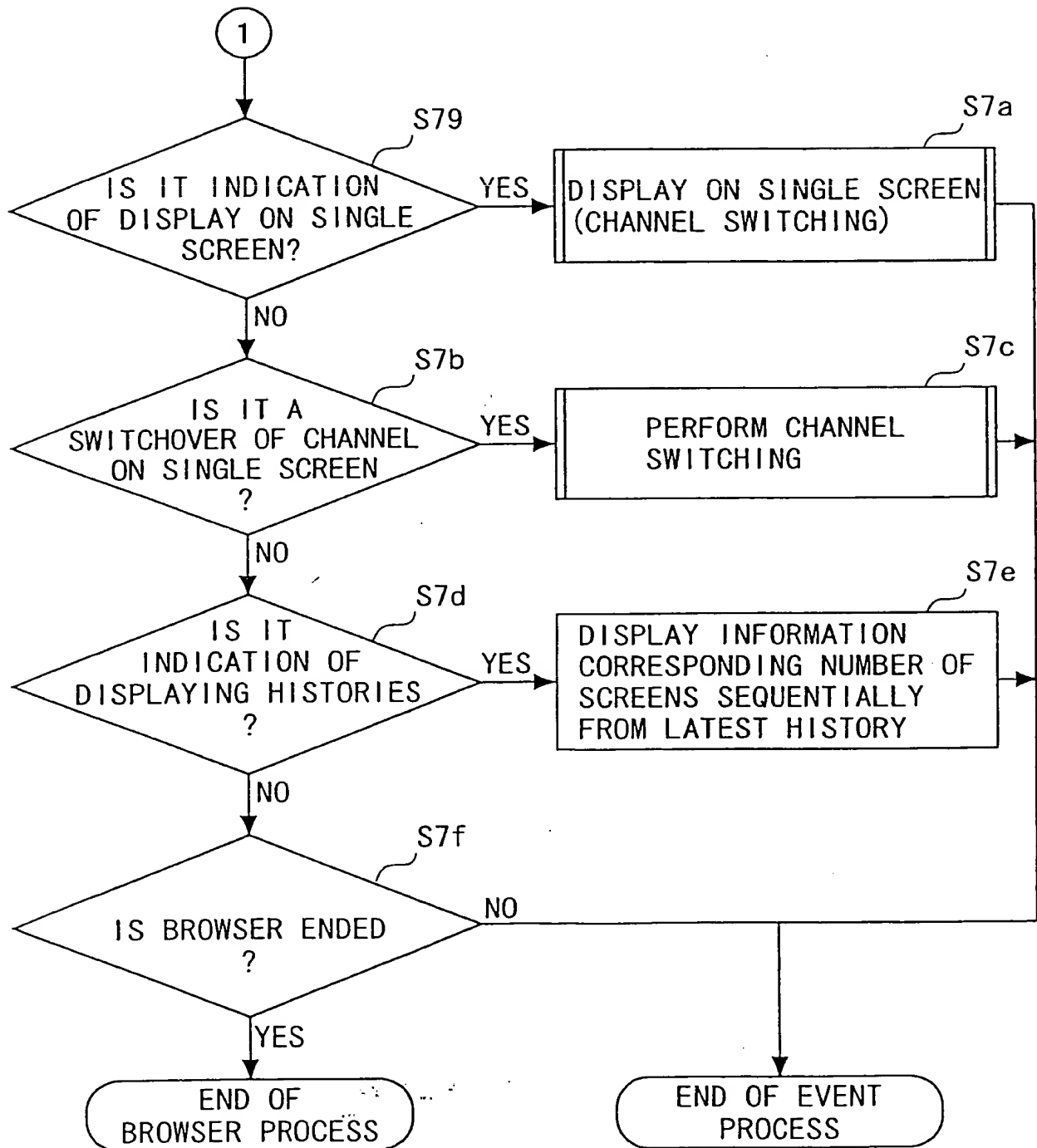


Event Processing (1)





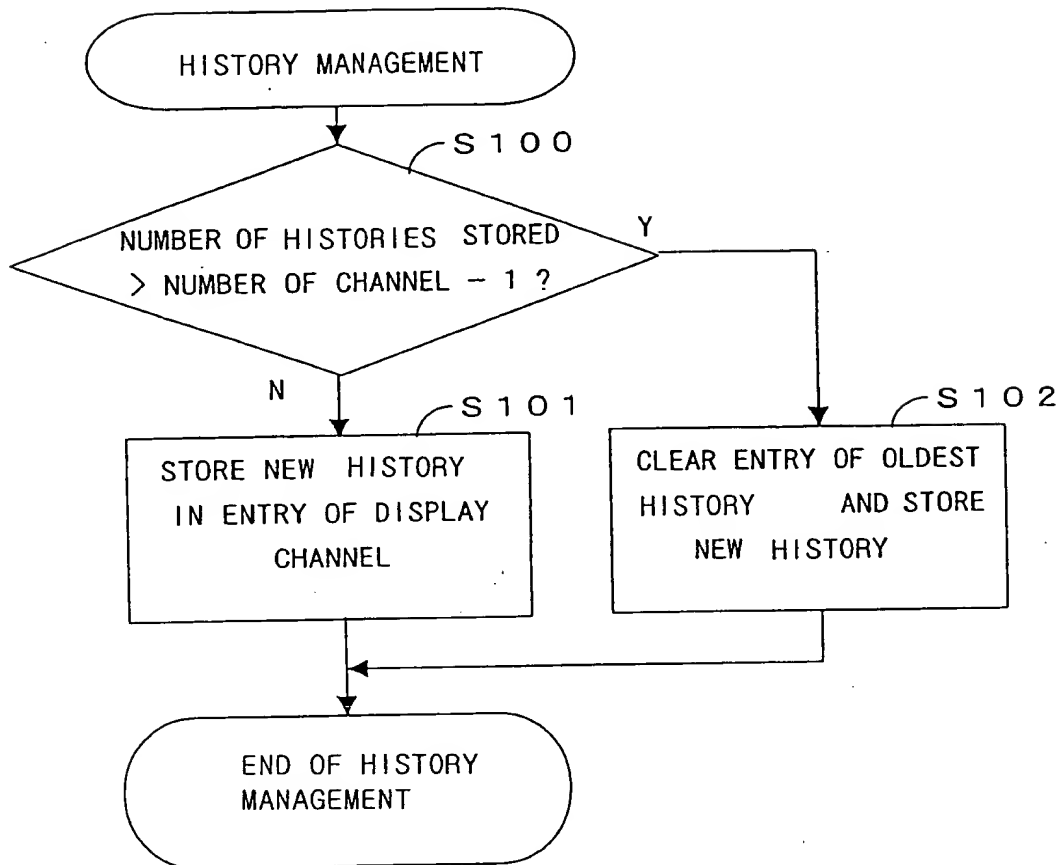
Event Processing (2)



[FIG. 12]

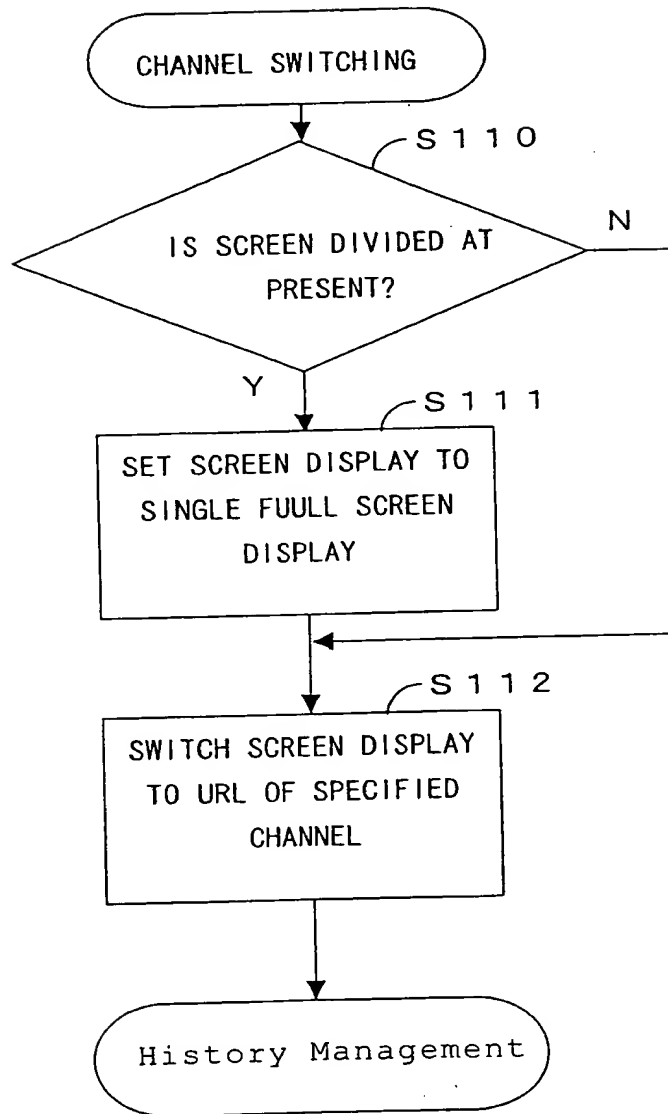


History Management Processing





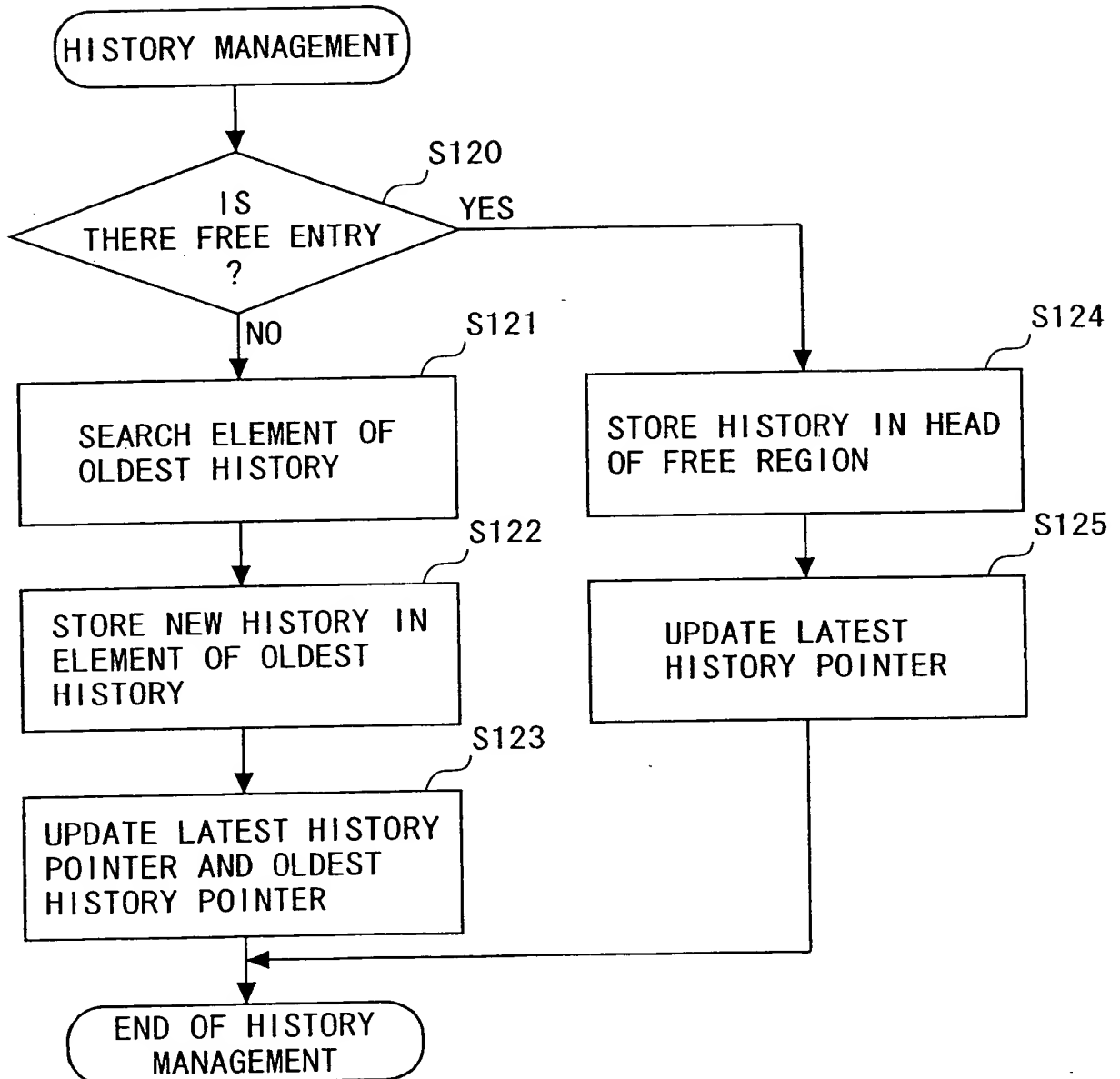
Channel Switching Processing



[FIG. 14]



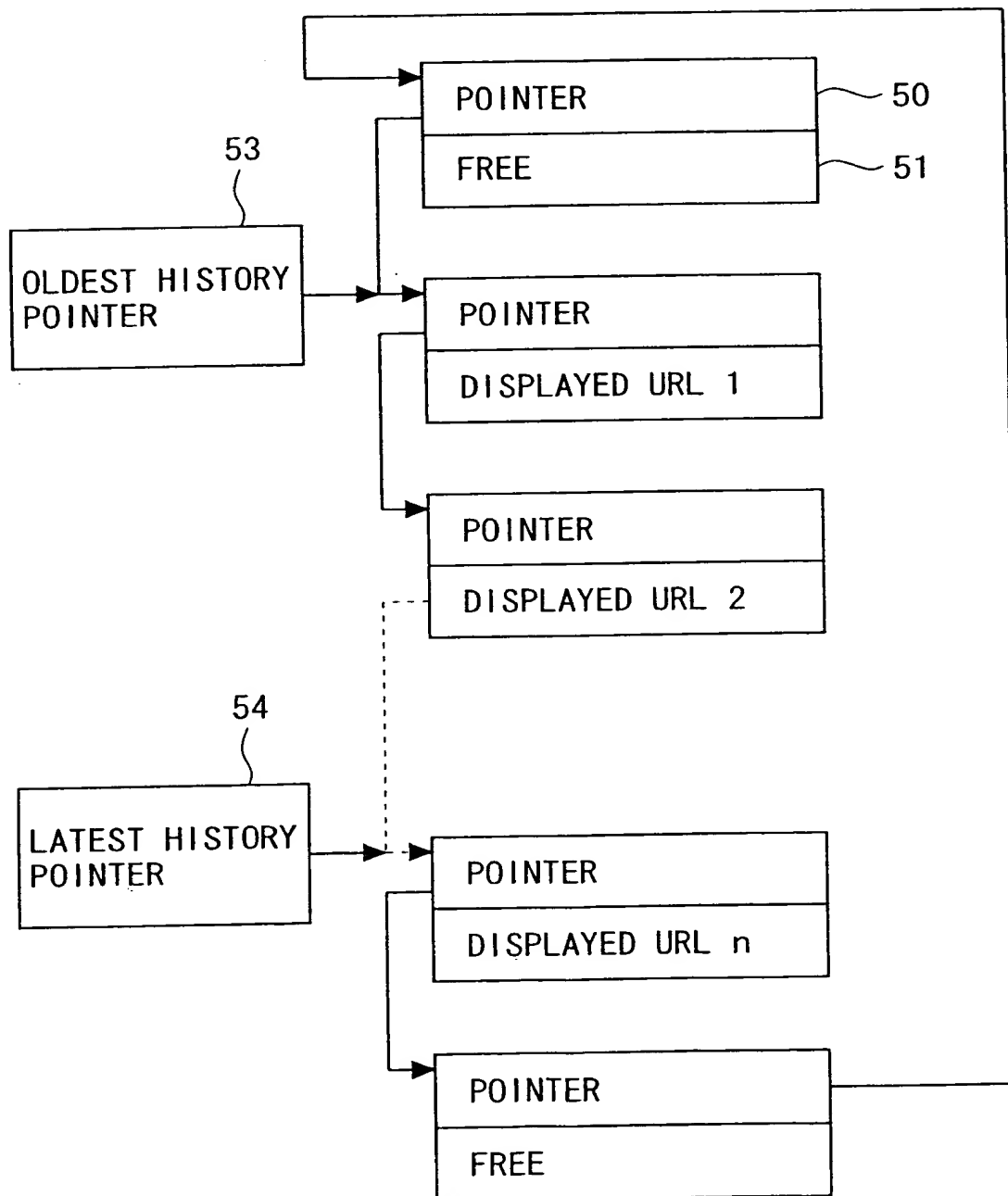
History Management Processing (Modified Example)



[FIG. 15]



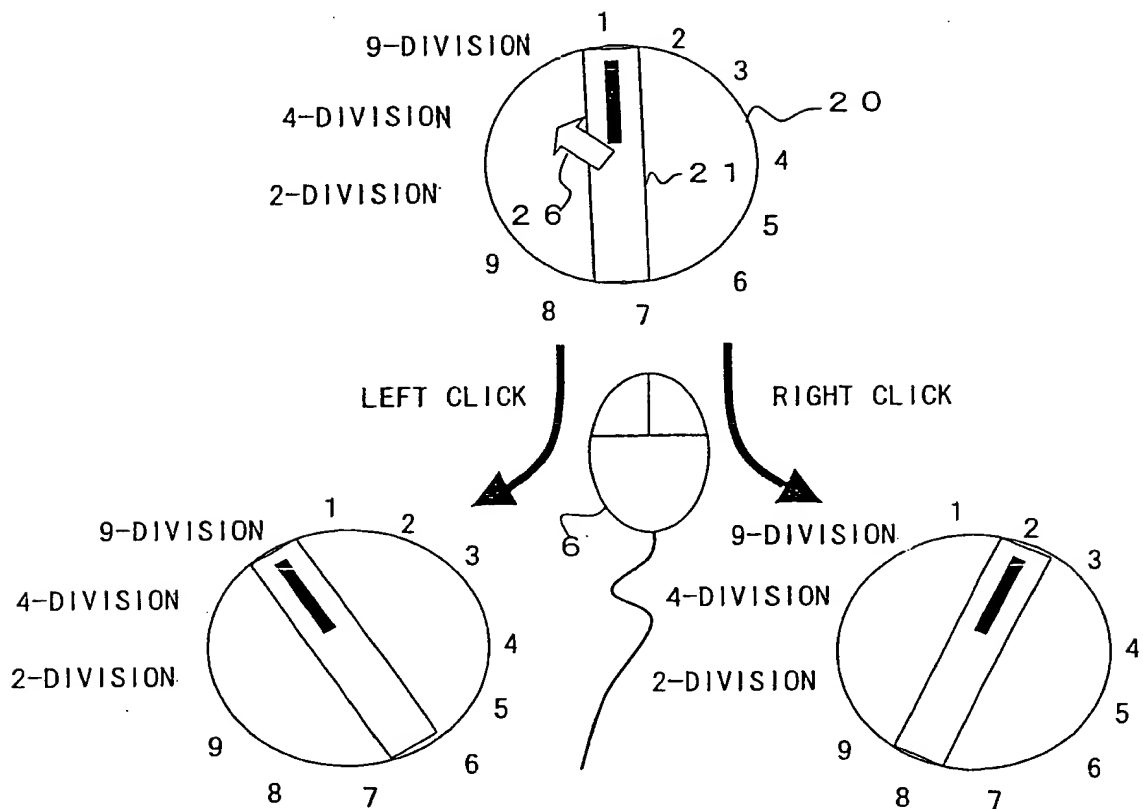
History Management List



[FIG. 16]



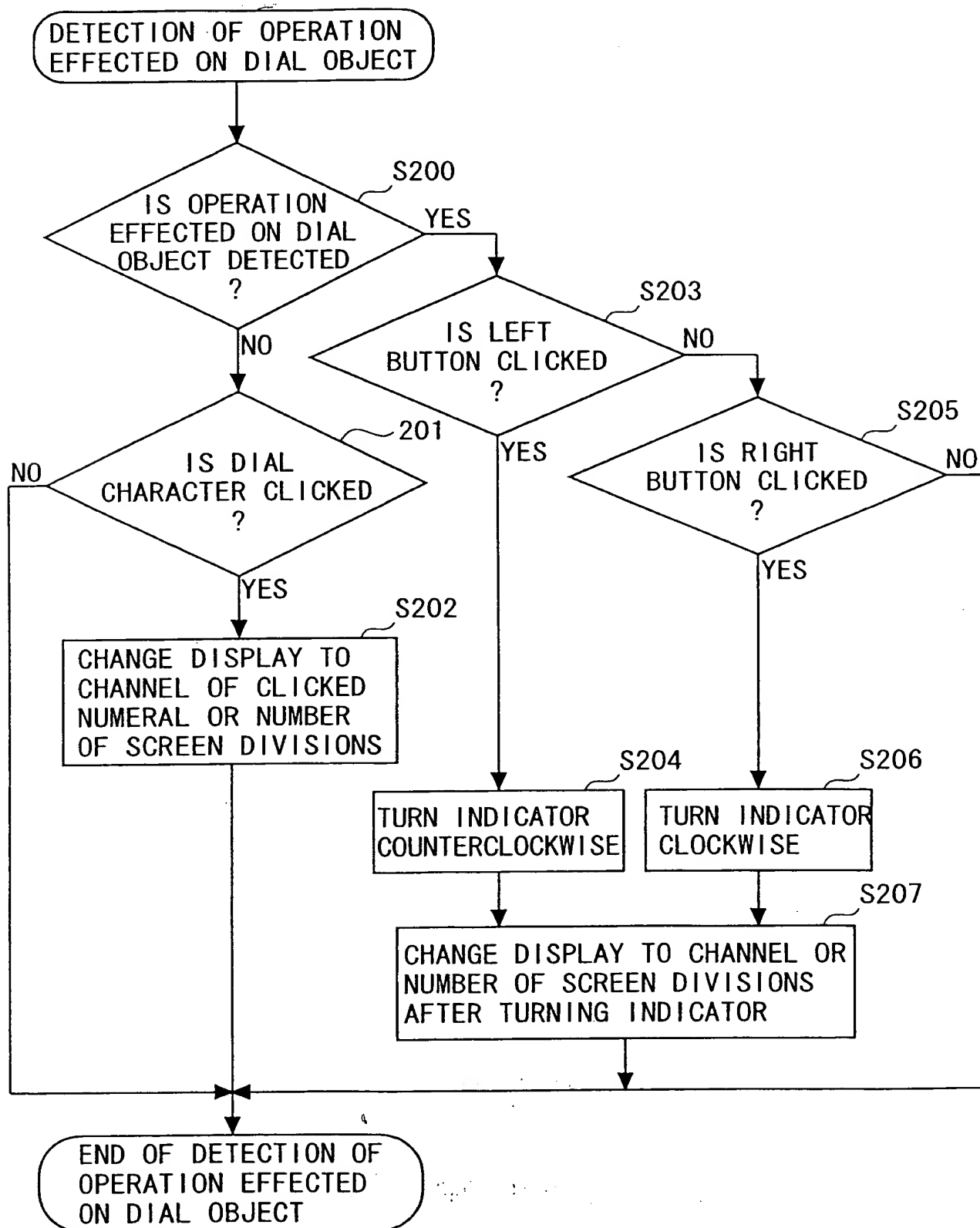
Explanatory Diagram showing an Operation effected on the Dial Object on the Screen



[FIG. 17]

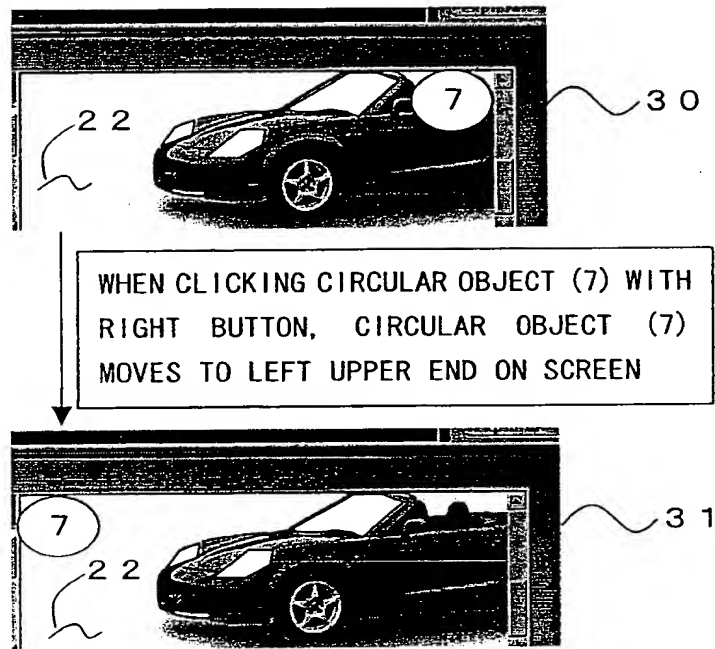


Processing of Detecting the Operation effected on the Dial Object





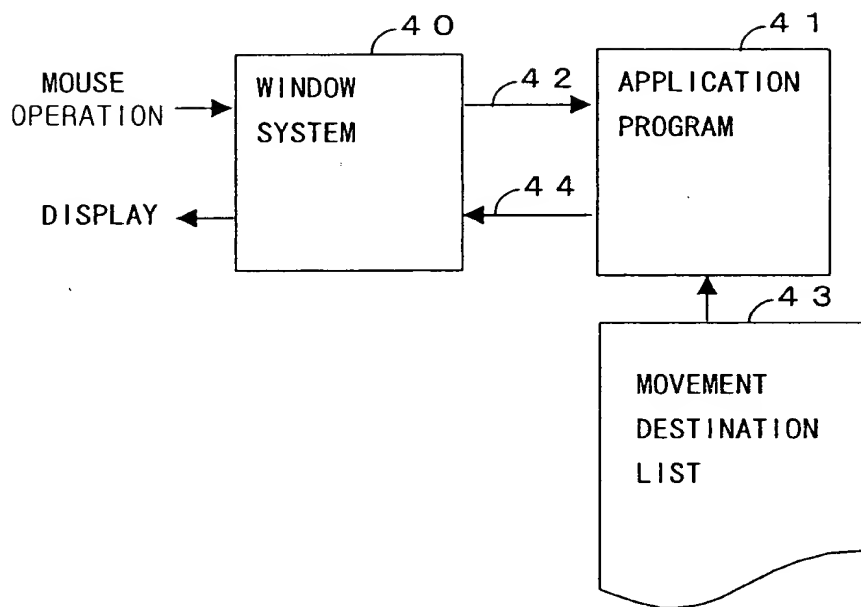
Explanatory Diagram showing an Object Moving Operation



[FIG. 19]



Diagram showing a Program Structure in a Third Embodiment





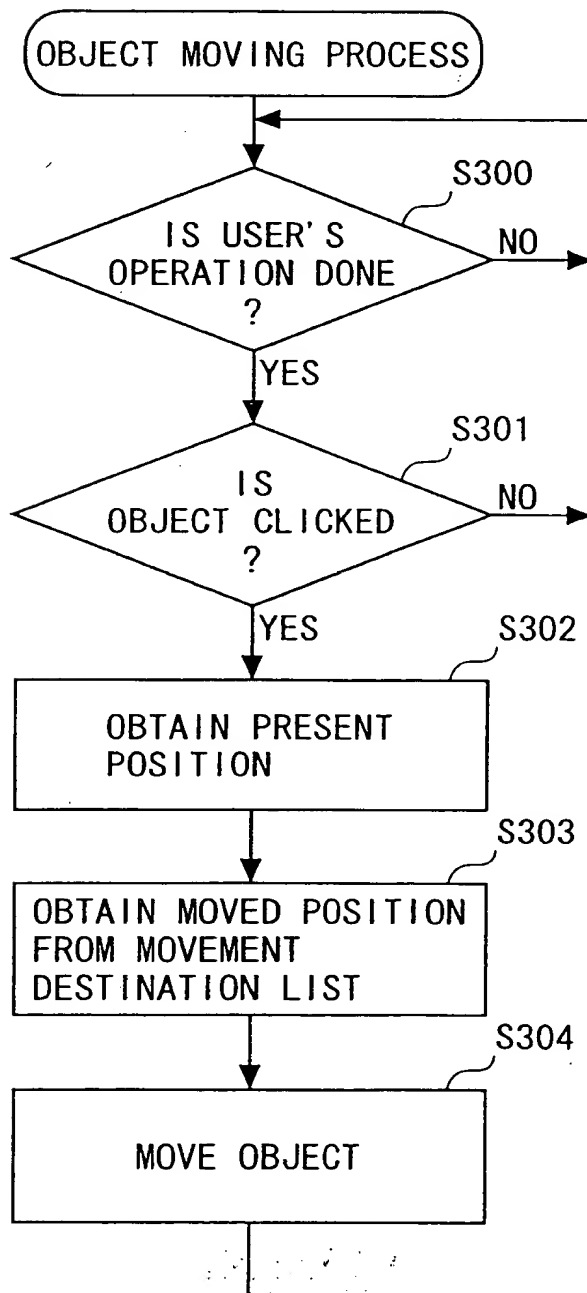
Movement Destination List 43

| PRESENT POSITION | MOVED POSITION | ORDER OF MOVEMENT |
|------------------|------------------|-------------------|
| 1 | LEFT UPPER END | 1 |
| | RIGHT UPPER END | 2 |
| | LEFT LOWER END | 3 |
| | RIGHT LOWER END | 4 |
| | CENTER | 5 |
| | LEFT MIDDLE END | 6 |
| | RIGHT MIDDLE END | 7 |
| | MIDDLE UPPER END | 8 |
| | MIDDLE LOWER END | 9 |

[FIG. 21]

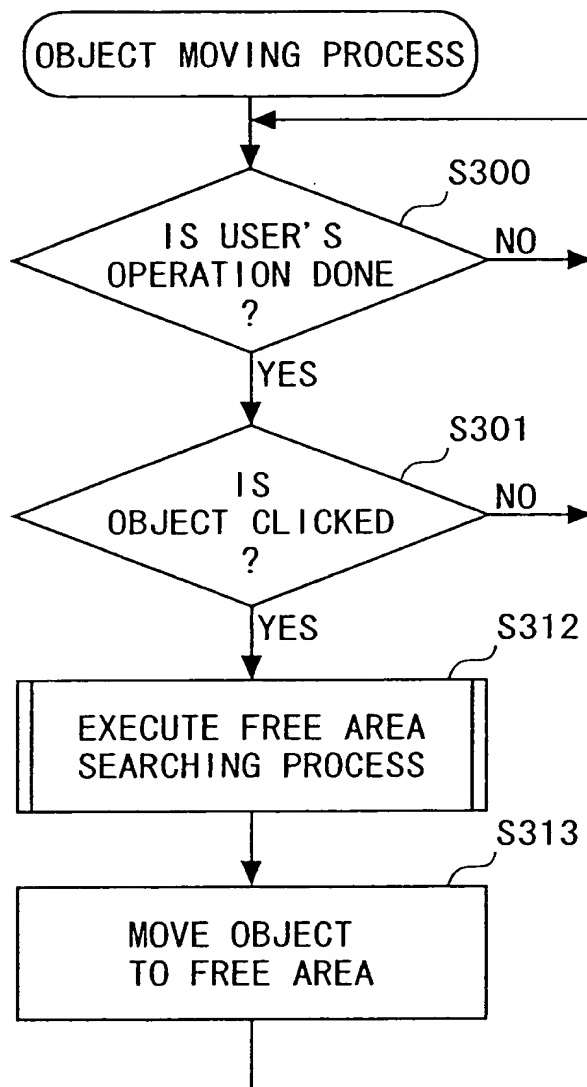


Object Moving Processing





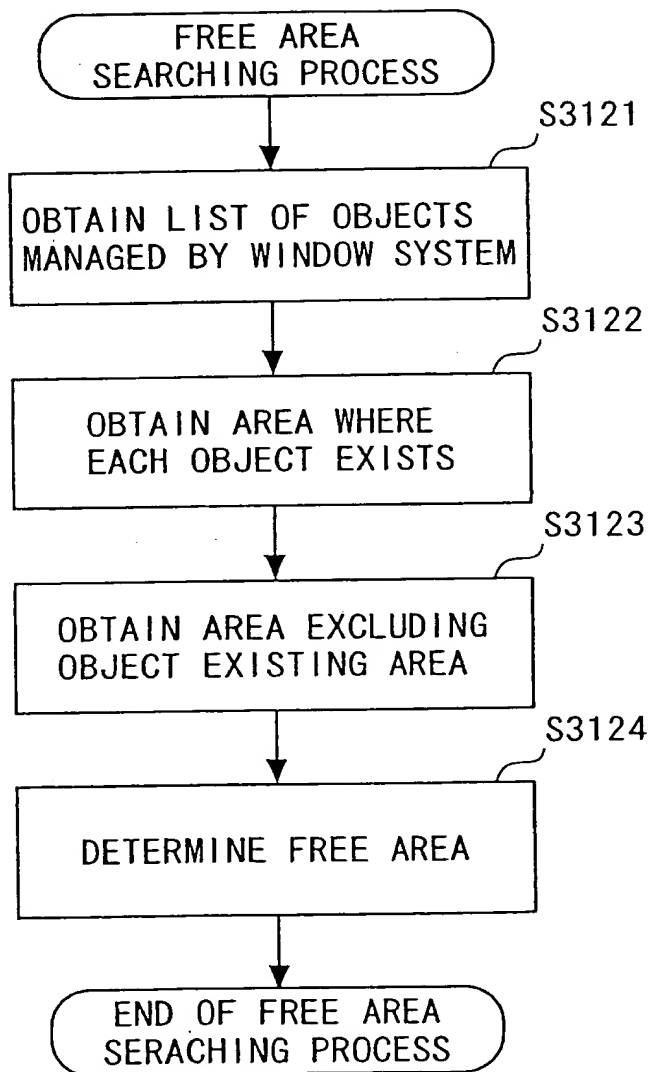
Object Moving Processing (Modified Example 1)



[FIG. 23]

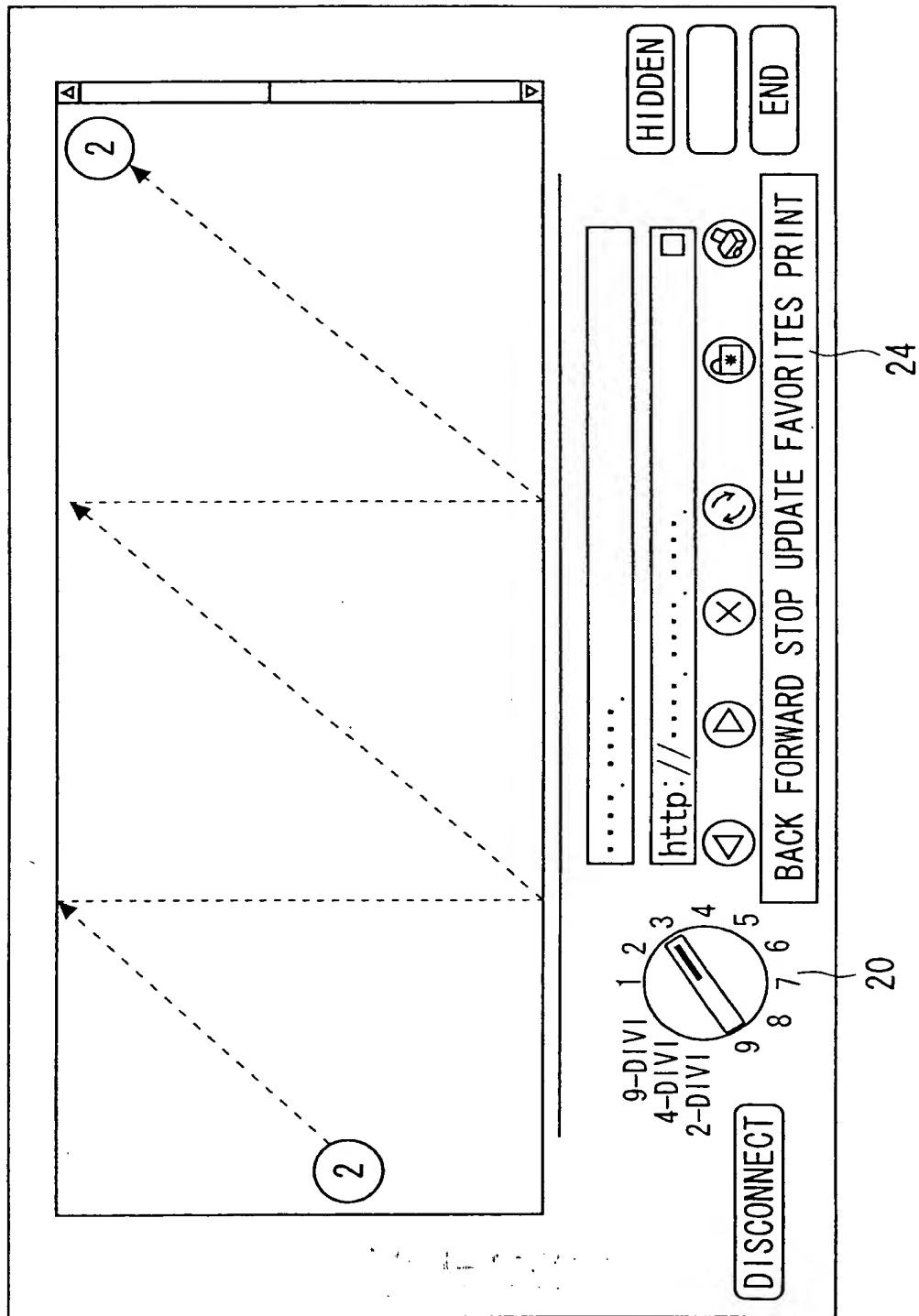


Free Area Searching Processing



[FIG. 24]

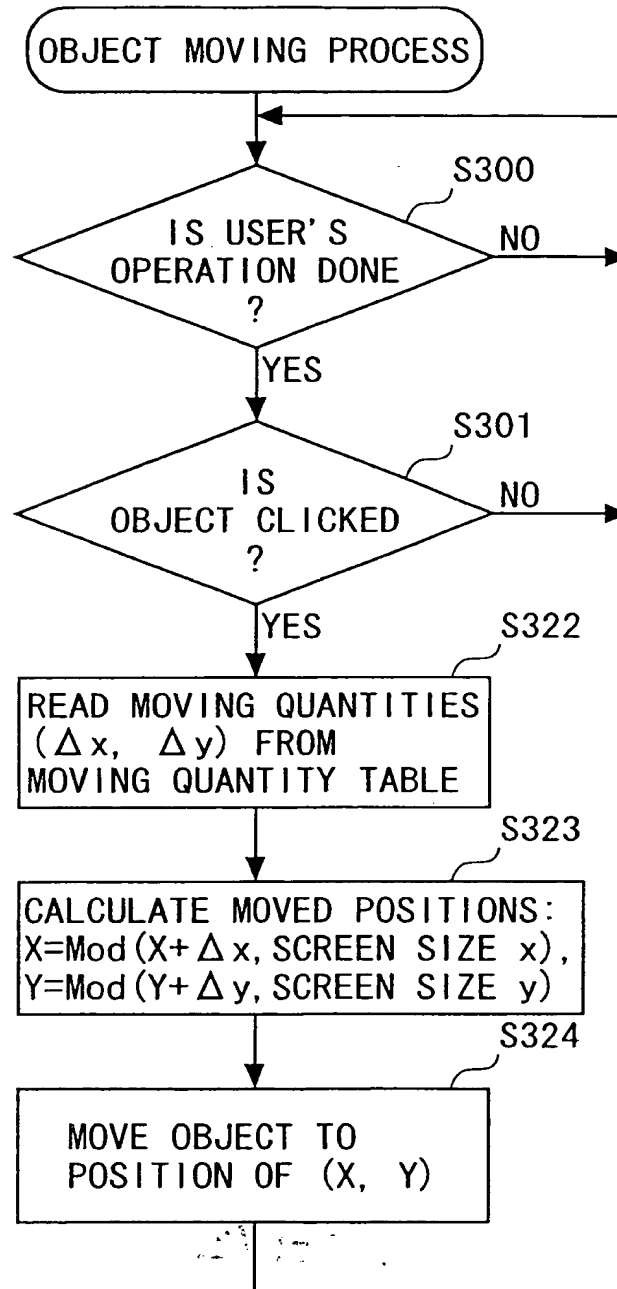
Moving of Object (Modified Example 2)



[FIG. 25]



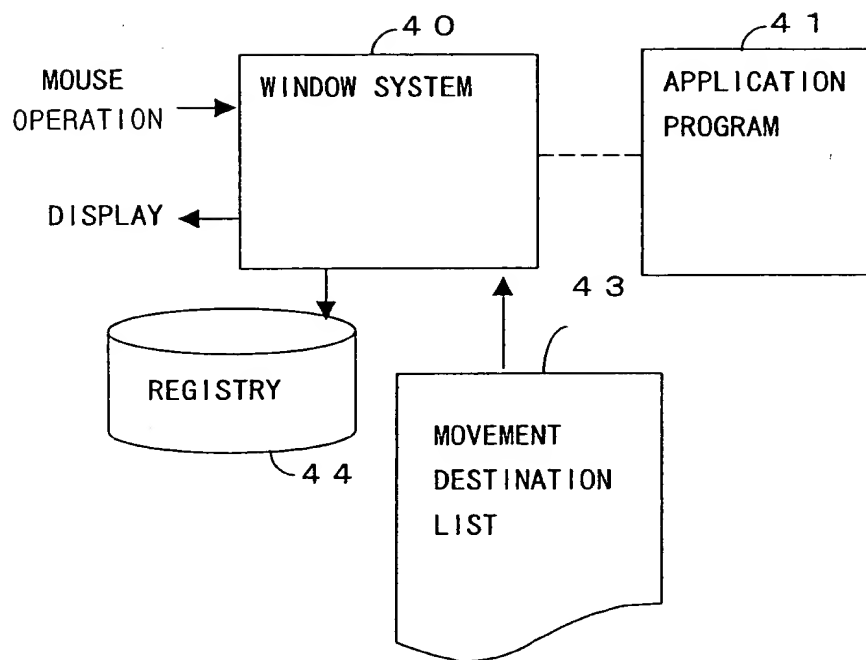
Object Moving Processing (Modified Example 2)



[FIG. 26]



Diagram showing a Program Structure in the Third Embodiment
(Modified Example 3)



[FIG. 27]

Object Moving Processing (Modified Example 3)

